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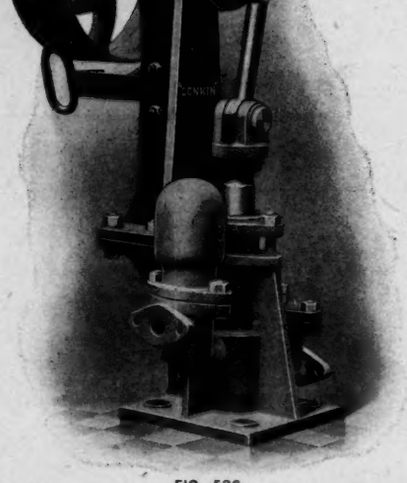

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EDITORIAL NOTES.

The Government Attitude on Freights.

IT is a favourite statement of chairmen of gas companies, and we suppose of other enterprises, that, when things are going well, the stock and share holders do not attend the meetings in such numbers as when things are going less satisfactorily, and when dividends decline. Dividends have diminished largely in the case of some gas companies working under the sliding-scale, owing to the war increase in the price of gas. Among such concerns is the Gas Light and Coke Company, whose dividend for the past half year is at the rate per annum of £4 4s., subject to heavy income-tax; while for the corresponding half of 1913, it was £4 17s. 4d., subject to a lighter income-tax. Nevertheless, it may safely be said that the meeting of the proprietors last Friday was one of the smallest numerically that there has been for some time past; and in this fact there is, under the peculiar and harsh circumstances of the times, genuine evidence of confidence in the Governor (Sir Corbet Woodall, D.Sc.) and his co-Directors, which is the best encouragement that the proprietors could possibly confer.

Those who were present at the meeting, and those who read with care the report of the Governor's speech, can only possibly arrive at the one conclusion, that all that has been active in producing disadvantage of a more or less temporary character to the consumers, the proprietors, and the employee co-partners, has been entirely due to outer causes and agencies, and that the Board of Directors and the chief officers have shown, through the results of their financial and managerial policy, considerable grasp and foresight in connection with the unprecedented situation. Many of the external causes which have acted so oppressively, but which are inevitable, the Governor says, the Company could bear with patience and with fortitude. But there are some which appear to him to have been altogether unnecessarily burdensome; and this particularly applies to the rates of freight from the Tyne and Yorkshire. There was a ring of indignation about both the locution and the delivery as he related the facts regarding the attitude of the Government towards this question, and the effects of the attitude. It has again been a case of neglect and want of prescience, and then of seeking for a remedy after substantial and irretrievable mischief has been done; and, in certain high quarters, the seeking is still being carried on in a way that suggests there are feared some hidden terrible consequences to any form of regulating interference.

Everything the Government have so far done has been an incentive to inflated rates of freight. The tale cannot be too often repeated as to how the Government, themselves paying a rate of freight of only 4s. per ton on commandeered colliers, insisted on receiving the extraordinary market rates for interned, unsuitable, and expensively worked steamers, and only to a very slight extent, we gather from Sir Corbet's speech, have they receded from this position. This has borne very heavily upon users of seaborne coal, and upon consumers of gas produced from such coal. While themselves engaged in making excessive profits through the interned vessels, the Government have been preaching against the sin and unpatriotism of manufacturers and traders exploiting the war for the purpose of unduly lining their own pockets. Example is better than precept. The preaching has been lamentably ineffective; and there were last summer merry twinkles in the eyes of certain members of the Government as they said they had well under observation the excess profit makers, and meant to make them disgorge their ill-gotten gain. But here again, when the hint materialized, it was found the means proposed by the Government of putting a brake on the making, owing to war conditions, of super-profits—means relieving the makers of such profits of one-half—merely acted, at any rate in the case of the so-called market rates of freight, as a stimulus to the putting-up of the rates to figures that would leave practically uninjured, after the deduction of the 50 per cent., the fat profits upon which the owners set their minds before the introduction of the Budget last autumn.

"Excess war profits" forsooth! Sir Corbet did not mince matters as to terms. He calls such profits by the more fitting descriptive term of "plunder;" and, in his opinion, a happier and more certain solution of the problem of preventing the making of such "profits" would have been to have taken, in the name of the nation—a nation at war, a nation that should be united as one in doing all humanly feasible to make the weight of it as light as possible—the whole of the excess profits definitely traceable to the existence of war conditions. Those excess profits—so much greater since the Government made claim to a moiety of them—have seriously injured the country and the people, and moreover are having a very deplorable effect upon the peoples of allied countries. They are being sorely irritated, and are becoming doubtful as to the sincerity of our friendship, through the terrible prices they are having to pay—due largely to British rates of freight—for coal and other productions that they require from this country. Other effects of the lethargy of the Government, and their neglect in taking this matter into consideration early in the war, is the fact acknowledged by Mr. Runciman that, while tonnage is short for the country's trade and requirements, nearly 300 ships have, since the outbreak of war, been sold to neutral countries. The Government ought to have prohibited all such sales. Then, further, Sir Corbet stated in his address to the Gas Light proprietors that he understood (though he could not personally vouch for the fact) that there are trading between foreign ports a number of British ships, the owners of which will not bring them back to England lest they should be called upon to contribute to her needs. Contemptuous language cannot be too strong for such men. However, this all goes to show that the treatment by the Government of the question of transport and freights has been muddled from beginning to end.

When cause and effect are considered, when pondered over are past professions on the part of the Government of inability to do anything in connection with this shipping question through the danger of something or other terrible happening, when we read the story told by Sir Corbet, and note his fully justified indignation over both the noxious action and inaction of the Government, a ray of humour falls across it all on reading in a prominent morning newspaper—eighteen months after the beginning of the war, and over twelve months after rates of freight began to show some uneasiness, and then took their upward bound—that "the "Government regard the regulation of shipping freights as "one of the pressing problems of the war." The pressure to-day is largely due to the Government's own past attitude; and this we must not forget. The humour is intensified on reading that they are working at the problem "with vigour, "and hope to obtain a satisfactory solution before long." We all hope they will. Sir Corbet, both at the Gas Light Company's meeting and at the Tottenham Company's meeting on Saturday, remarked upon the fact that the Government have at length appointed a strong Committee to consider the propriety of taking entire control of the mercantile vessels of the country, so that the ships can be used for the urgent service of the country, and at reasonable rates of freight. We hope the Committee will speedily set to work, and will make their power felt in the right quarters and in the right manner; and if their recommendations afford relief from the incubus imposed upon the country by the shipowners, they will have performed a wonderfully good piece of work. A strong Committee is no good, however intrinsically potent their recommendations, unless there is a strong Government Department to receive them, and to successfully urge forward their adoption. Sir Corbet is pleased at the appointment of the Committee; and he has hopes of it. Had it not been for this appointment (he said at the Tottenham meeting), he should have looked at the coming

year with consternation. This indicates a confidence in subsequent action by the Government, who have hitherto been so chary over interfering with the shipowners, and who now, if the appointment of the Committee really means action, have got to throw to the winds their past excuses for non-interference.

However, from the general to the particular. The gas industry has a good right to complain of the Government so long turning a blind eye upon extortionate freight charges. The industry knows precisely what it costs to run colliers from the North to London. Last half year the running costs of the Gas Light Company's own ships varied between only 3s. 2d. and 4s. 11d. per ton; the "market" rate of freight was just recently up to 17s. 6d.; some gas coals are to-day being brought from the Tyne to the Thames at 14s. 6d. per ton; and the Government are commanding from 10s. to 14s. per ton for interned vessels. What possible justification—and in war time—could be advanced for the difference between the actual costs of the Gas Light Company's own vessels and the market and Government rates? The gas industry, too, can complain of a want of reciprocity on the part of the Government. One department is day by day pressing gas undertakings for more and more toluol; and, realizing the necessity of increasing the source of its production, it has suggested to gas consumers that they will be rendering help by consuming more gas instead of coal. Another department has for long defended the attitude of non-interference with the so-called market rates for freight, which have largely been the cause of the necessity for putting up the price of gas to figures which nullify the advice and efforts to enlarge the consumption of gas. The departments have been at cross purposes. May we hope that the Committee charged with the duty of inquiring into the question of sea transport will speedily put an end to this state of things in the imperative interests of the country. Anyway, we trust that Sir Corbet's protest will have good, full, and lasting effect.

The Chemist and Fuel Economy.

THERE is no question that chemists as a body have not been immune from the human failing of having left undone many things that they ought to have done, and of having done many things that they ought not to have done. We are not prepared to make the indictment more specific, except in the one glaring particular that they have not hitherto done anything much outside their own immediate and individual spheres of operation in endeavouring to bring about a general economy of fuel by the adoption of improved processes, and the extraction from coal of the maximum value in products. They have shown, as a body, a passiveness over this matter which, for men in their position, amounts to sheer negligence of a great opportunity; for coal is in a no inconsiderable part at the very base of their professional work, and its proper utilization is the best possible contributor to the broadening of the foundations of their profession and the expansion of their opportunities. In his second Royal Institution lecture [see *ante*, p. 253], Professor W. A. Bone remarked that, as a chemist, he ventured to suggest that what should be aimed at in all schemes of fuel economy is the abolition, wherever possible, of the present truly barbarous custom of burning raw coal, which not only entails the loss of valuable bye-products, but also involves the production of black smoke, with its attendant evils. We submit that chemists ought—it was due to their profession and to their place in the country's work—to have tackled, and to have long ago made themselves felt in relation to, this huge economic problem, and not have left the inauguration of a general movement to this end till the year 1915, when Professor Bone took the matter seriously in hand in his Presidential Address to the Chemical Section of the British Association, and has since followed it up assiduously in a manner that cannot fail to have effect, immediate and ultimate, to the progressive benefit of the country. Fuel departments have been inaugurated at our universities and technical colleges, and men have been, and are being, trained to deal scientifically with fuel problems. This work is having, and will have, lasting economic advantage; but there is an individuality about the beneficial results, and not that general effect which it is hoped to attain (and which will create a greater demand for the trained individual) by a larger and public movement, fostered and aided by the Government as the right courses to pursue unfold themselves.

What is required at the back of a protagonist in a new movement of this kind is an army of willing adherents, ready to assist in stimulating interest both by personal effort and influence among those with or for whom they are working. The greater the aid rendered in this way, the larger the generation of interest, and the more certain is ultimate success. The chemist is engaged on routine duty and research now more or less in almost every industry; where he is not, he ought to be. In those industries in which he is operating, he ought to be a person of influence. At any rate, no one is better personally qualified than the chemist for helping forward this cause of fuel economy, and of the only legitimate uses of coal, which uses are those that do not involve a destruction of valuable products, which are the important raw materials of national industries—the textile, chemical, and agricultural among them. In his second Royal Institution lecture, and in the third one [the latter is published this week], Professor Bone directed attention to industries in which there is scope for large fuel economies. The greatest margin for economy, he said, in the second lecture, is to be found in the coal used at mines for coking (especially in connection with the beehive ovens), in factories, in iron and steel works, and for domestic purposes; and in the third lecture, the use of fuel—solid and gaseous—for the provision of power was dealt with. In the directions cited in the second lecture, a quantity of coal equal to practically four-fifths of the total home consumption is accounted for. The industries mentioned, together with the comprehensive term "factories," cover a large area within which chemists are now actively at work, and should be so to a still larger extent. But the important point is the declaration of Professor Bone—and it is a reflection upon manufacturers and upon chemists as a body for not bestirring themselves earlier in the matter—that, while there may be some industries in which a satisfactory alternative to the use of raw coal may not be immediately forthcoming, in the vast majority of cases serious fuel waste is found for which no really adequate excuse can nowadays be made.

As to the domestic use of coal, there reform must proceed somewhat more slowly, by education, example, and development of the efficiency of heating methods which do not involve waste. Here, again, the chemist should be a person of large influence, and not the passive onlooker at a continuing dissipation, from about 30 million tons of raw coal, of the whole of the ammonia, tar, benzol, naphtha, and other bye-products, representing a value of millions of pounds sterling. This single statement comprises vast opportunities for the chemist; yet he has been—though having a primary interest in the matter—supine and negligent in regard to it. The alternatives to raw fuel for domestic purposes are those that are labour-saving and non-smoke producing—gas, coke, and semi-coke. In his second lecture, Professor Bone bore independent testimony to the efficiency of the modern gas-fire in regard to radiant power and from the hygienic point of view; but he urged the provision of cheaper gas as, with efficient gas-fires, the best propelling force to their adoption. The gas industry recognizes the need; it looks with regretful eyes upon the delimiting conditions of the present, and upon the prospective dearness of coal and increased costs in other directions. But it hopes on; and it looks to the chemist for aid in producing economies which shall in some measure provide compensation to externally imposed obstacles. It is quite true that we have to reckon with the fact that about five times as many heat units can be obtained from coal as from gas—calculating that gas costs as many pence per 1000 cubic feet as coal does shillings per ton. But this fact has not so far been one that has weighed very heavily on the modern progress of gas heating. The more potent influences to adoption have been labour saving and convenience, combined with a good radiant and hygienic efficiency, and that at not (all things considered) relatively much greater cost than coal—particularly for intermittent use, and for continuous use where care is taken to regulate according to temperature requirement. These influences Professor Bone does not mention.

In the quest for fuel economy in the household, Professor Bone looks upon semi-coke as something that will find favour, if the price is right, and if it can stand transport without crumbling up. Apparently, too, he thinks that the war has imparted to low-temperature carbonization processes a larger hope of success than they ever had before, if honestly worked at as a technical proposition on sound

lines and with scientific supervision, and without attempts by company promoters at financial booming. It is plain, however, that Professor Bone is not satisfied that these processes have advanced beyond the early stages of technical development. If this is so, there may be a woeful awakening for those who are—is the Ministry of Munitions in any way financially involved?—incurring large financial obligations for the realization of products on the strength of experimentally produced and more or less paper data. Professor Bone is a chemist. The rich light oils of the low-temperature tar are therefore an attraction to him; they contain paraffins, naphthenes, benzenes, and phenols, which from the point of view of motor fuel have interest. But it is certain that, while he looks forward with confidence to this process coming in as an adjunct to the older methods of high-temperature carbonization, he is not satisfied the technical development of the system has yet been carried far enough. There are those who have been engaged in connection with low-temperature processes who will not agree with this estimate of the present position, while concurring without qualification in the anticipation as to the future. There are advice and counsel in the words: "The "question of low-temperature carbonization is so impor- "tant at this juncture that the Government would do well "to have its prospects investigated and reported upon by a "body of independent and disinterested experts as a precau- "tion against possible set-backs by the foolish or premature "company promotion which so often in this country ruins "the commercial prosperity of a good thing."

All through the piece, the chemist has an inseparable place in this question of fuel economy and the most profitable utilization of coal; and it is for the chemist now to do his part in helping forward a movement which will be beneficial to the nation generally, and not in the least part to his own profession.

Looking Forward.

THERE must always be a looking forward, so far as is possible, with the view of determining what it is necessary to do in the present, in order to be prepared for probable succeeding conditions; and particularly essential is this at the present time in connection with *post*-war probabilities and possibilities. In the gas industry, this applies to everything—from administration to executive work, from capital expenditure to return, from coal purchases to the sales of gas, coke, tar, sulphate of ammonia, or ammoniacal liquor. In no single respect, can we afford to neglect consideration of the conditions that are, subsequent to the war, likely to environ our operations in all these directions, and especially so in the matter of the nature of the competition that will have to be met. It would be folly to assume that, with the cessation of hostilities, we are simply going to return to pre-war conditions. Everything will be totally different; and every industry and every concern will be making most masterly attempts to ensure its profitable ends being as substantial as possible. Whatever our competitors—whether coal merchants, electricity purveyors, manufacturers and dealers in tar products and sulphate of ammonia, or anything else—may do to promote their trading, our business should be, and must be, to endeavour to be prepared to go one better. We know that the coal merchants will use every effort to stem the flow of the popularity of gas for cooking and heating, and to stunt the growth of the applications of coke. The electricity industry has a Development Committee considering matters. Germany, when free to the seas again, will be keener than ever over tar products and sulphate of ammonia, and will carry on their competition seriously. We must look forward.

Much interested, too, will the British gas industry be in what Germany is likely to do after the war in connection with such things as gas-fittings, mantles, glassware, and requisites to the business of gas undertakings, which have been made prolifically in Germany, and in which there has been free traffic in this country. As to glassware, there are rumours as to the likelihood of imports being prohibited for a period after the war, and then subsequently a tariff being imposed. Some colour is given to the rumour by the White Paper issued last week, reproducing the report of a Special Committee of the Board of Trade Advisory Committee as to the measures to be adopted for securing after the war the position of certain branches of British industry. The industries dealt with by the Committee include glassware; and one of the recommendations is that manufacturers who develop industries and produce goods that have hitherto been largely imported should be afforded sufficient tariff protection to enable them to maintain production after the war. Tariff or no tariff, with those gas undertakings that are patriotically inclined, free traffic in German and Austrian goods, we are told, is absolutely ended; and patronage will henceforth, as far as possible, be by them conferred on goods made in this country, and not for the profit of Germany. These are all matters calling for the industry's consideration in respect of prospective conditions. It is well known that—even during the war, while no overseas business is doing—German commercial enterprise extends to the maintenance of agencies and trade emissaries in all parts of the world. It is therefore the duty of this country, and of the gas industry so far as it may be affected, to look seriously to the future, and to counter the enemy by every legitimate means.

In connection with trade generally, through the war we know better than ever before the methods of Germany in building-up a tremendous export trade, and in investing capital in other countries, with the twofold object of localizing, and obtaining some measure of control over, manufacture and trade and thereby profiting Germany, and in reducing the competence of manufacturing countries, through this localizing of manufacture and trade, from competing with Germany's export trade. For example, we know that in regard to certain electrical goods made in this country, German capital was largely employed, and that the export business in these particular goods to other countries has been carried on from Germany. This country has in consequence been the poorer. We are aware, too, how Germany obtained complete control of monazite sands and the supply of thorium nitrate—even of the Travancore sands of India. Since war broke out, there has been greater general interest in the German dye and chemical industries, which have largely derived sustenance from the tar produced by British gas undertakings and coke-oven plants. We know what has been done in these respects; and we must take into account the certainty that the trading acumen and ruses of the past will represent the minimum of what will be done in the future, when Germany comes to grips with other nations in trying to retrieve her lost overseas fortunes and position. Therefore, when in this country we say: "Never again will "we allow Germany to get so far as she has done before in "the work of, by any insidious means, endeavouring to sub- "jugate our industry and commerce," let us hope that one and all mean it, and will patriotically work to this end. The country has made tremendous sacrifices in life and money; and, while life cannot be recalled, much can be done in repairing the other losses by the aid of our resources, fertility of mind, and scientific attainments, if only properly used and applied to the work of expanding our trade by lessening German imports, and doing all possible in increasing our exports at the expense of Germany.

Of course, no one anticipates—no one would be so foolish as to anticipate—that Germany's overseas trade can ever be wholly killed or captured. What can be done is to make as dead-certain as possible that the trade is reduced to the utmost possible limit, and that the economic subjection which Germany was working to place on this and other countries, is definitely made her own portion. The means of doing so have been under discussion in the House of Commons on more than one occasion lately; and the Government and the Board of Trade are taking a lively interest (if not as yet a very fruitful one) in the matter. They recognize that our financial strength can be, and must be, increased through our industry and commerce, and our industry and commerce must be fostered by the Government. But the trouble is that, while all this is recognized, there is an exceedingly modest appreciation of what is requisite; and so a very large vital question is being dealt with in very niggardly and slow-moving ways. Mr. Runciman has made some excellent speeches on the subject, and has given some philosophic advice, and has shown that the Board of Trade have the matter under consideration from many points of view. Preparation for the commercial war that is to come is a matter of considerable magnitude and importance; but the only practical thing that the Government have done so far has been to help forward the national dye scheme. Nothing else has issued from all the investigation, the Committee work, and the torrential flow of talk over future trade. Yet we have seen eighteen months of war; and the time of preparation of practical methods to gain the material ends in view is being lavishly spent. Matters, in short,

are proceeding as though the war is going to last for at least a generation. We are told by Mr. Runciman that, if we are to hold our own, we must be adaptable. The country has shown its adaptability in a striking manner in respect of the production of munitions. We are told, too, that there must be improved and greater research in connection with industry, that there must be larger facilities for the training of young men for such work, and that there must be no attempt to economize on the money spent on technical colleges and schools and modern appliances. This is all good. But the views of the Government regarding these matters have been seen in the paltry votes of annual expenditure on research in relation to the dye scheme, and in connection with their Industrial and Scientific Research Committee. It is also urged that there should be an extension of commercial banking in order to help young industries to get on to their feet, that there should be assistance in the development of new inventions, and that there should be a remodelling of the conditions affecting the use of patents. Our transport facilities—sea and land—require to be better mobilized; and labour, too, should be brought into the work of organizing schemes of trade expansion. Last, but not least, coal and oil supplies for the country should be brought under better control.

All this is excellent; but, although in these days we do not expect miracles, if something practically effective is to eventuate, there ought to be present signs of it. There is nothing of the kind; nothing tangible so far; nothing to enlarge our hopes. Will there ever be, unless a body is specially appointed to relieve the Board of Trade and political domination of the work of devising what is necessary to foster industry and trade generally on the best possible lines, and to counsel the Government in regard thereto—a body of a composition which will include representation of industrial, financial, scientific, transport, and labour interests. At the Guildhall meeting last week, the establishment of a Ministry of Commerce was suggested; but the effectiveness of even this would depend upon composition and powers. This preparation for after-war trade is a large matter, and one of vital importance to the economic advancement of the nation. As such, it requires to be dealt with in a liberal manner.

A Joint Committee on Meter Failures.

The last two or three years there has been developed considerable failure on the part of gas-meters to register accurately. This experience is an increasing one; and it is becoming a seriously acute matter. Sir Corbet Woodall referred to it at the meeting of the Tottenham District Light, Heat, and Power Company on Saturday. There must be something unusual to account for this phenomenon, in view of prior satisfactory experience. The meter makers are under the impression that the cause may be traceable to alterations made of recent years in the methods of gas manufacture. However, it is not a matter for haphazard speculation; and so a Joint Committee of the Institution of Gas Engineers and of the gas-meter makers has been appointed to carefully investigate it. Current conditions, of course are against progress being made with the work; but it is proceeding as vigorously as is possible. Sir Corbet said he hoped the inquiry would result in valuable information being forthcoming. That is also the hope of all who are interested.

Sulphate of Ammonia Export Licences.

Since the articles on this subject of a week ago, we learn, on inquiry of the Chairman of the Sulphate of Ammonia Association (Mr. D. Milne Watson), that the position remains unchanged. There is no doubt that the Government have been extremely ill-advised in advertising the fact that exports have been prohibited, as this announcement has made the agricultural community expect that it will be able to obtain supplies at a much lower price. Seeing that the price which sulphate of ammonia manufacturers fixed for home use about the middle of December is 30s. to £2 per ton below the last export prices obtained, there is no reason whatever to reduce home prices any further. Unless farmers make up their minds to buy and take delivery promptly, the Government will unquestionably have to issue further export licences; otherwise many plants will have to close-down. Everything points to there being plenty of sulphate of ammonia in the country to supply farmers' needs; and it is surprising, to say the least, that, in face of this, the Government are refusing to grant any licences for export to France for agricultural purposes, though the much-reduced French production is not equal to the demand. It is certain that hard things will be said about this in France; and it seems almost incredible that the British Government should wish to starve our Allies.

Charges for Restricted Public Lighting.

There has been a fair amount of local discussion here and there, but only in one case litigation, as to what should be the proper charge for contract public lighting under the current restrictions by the military authorities. Important local authorities and important gas companies have found ways and means of amicably settling the matter without being obstinate and unreasonable, and running money to waste by referring the matter to the Law Courts. It has remained for the Leiston District Council, whose existence was previously hardly known by the rest of the world, to go a contrary way. The contract for public lighting included the provision of the lamps, their repair and upkeep, as well as the supply of gas. The District Council contended that, as soon as the military authorities inhibited the lighting, the agreement came to an end. There may be an appeal in the matter if unwise counsels prevail, so that we will not say fully and emphatically what is our estimate of the contention of the Council. Mr. Justice Low did not think much of it; for, in his view, the suspension of the lighting did not at any rate cancel the contract for the provision of columns, lamps, fittings, repair, and upkeep in readiness for a resumption of lighting permanently or on emergency. Nor had his Lordship any power to suspend the contract while the restrictions continue in force.

Mr. Justice Low's Endorsement.

However, there is one ground upon which to thank the District Council; and it is that their action secured an endorsement from his Lordship of what has been the almost universal practice in dealing with contract charges for public gas lighting in view of the restrictions. The Company had offered to give the Council credit for all the gas unconsumed; but the Council preferred litigation to the suggested compromise. His Lordship thought it a pity the Company's offer was not accepted, and suggested that it would be a wise and a fair thing if all local authorities, in similar circumstances, would come to some such arrangement, instead of spending the ratepayers' money in litigation. We hope local authorities will take heed of the judicial opinion, and Parliament of the suggestion that a clause might be inserted in one of the emergency measures for bringing about the adjustment of such a dispute as this Leiston one, which ought never to have found its way into the Law Courts. The fault for this lies with the obstinacy of the Council in not appreciating what in the circumstances was equitable, and what was clearly regarded by the Judge as a selfish attitude.

Gas Manager Claimed to be a "Workman."

The circumstances under which, last September, Mr. E. H. Millard, who had for thirteen years been Manager of the Cowes Gas-Works, met with his death, formed the subject of an application in the Isle of Wight County Court last week, when Mrs. Millard claimed compensation, under the Workmen's Compensation Act. Deceased, who was 54 years of age, went to work on the morning of the day of his death, apparently in good health; and while actively superintending the installation of a new governor in the retort-house, he complained of pain in the chest. Returning to his house, he passed away before the arrival of medical aid; and at the subsequent inquest, the Coroner's Jury returned a verdict to the effect that he died from *angina pectoris*, accelerated by gas poisoning. In the event, at last week's hearing, the legal bearings of the claim were not decided, because before the arguments had proceeded very far a settlement between the parties was arrived at, under which the widow is to receive a small sum by way of compensation, together with an amount for costs. From our report of the case, however, it will be noticed that, on her behalf, it was admitted that there was a difficulty in proving that Mr. Millard was engaged in "manual labour," and that there were also other difficulties in the case, though the contention put forward was that he was actually on manual labour, by reason of strike troubles, shortage of workmen,

&c., which had compelled him even to take off his coat and act as a stoker on night shifts. The point of view taken by the Council's advisers was that Mr. Millard could not be held to be a workman coming within the Act. He received a salary of more than £250 a year, and was engaged under a written agreement by which he was Manager of the works. Whatever may be thought of the legal aspects of the case, all will feel sympathy with the widow and her young family in their trouble.

Showroom Attendants.

In his second article on "A Plea for Showroom Reform" (which appears in this issue), Mr. Cyril G. Davis has a little talk with showroom attendants; and he furnishes them with a range of precept on personal appearance and conduct, attitude towards customers, and mental equipment which, if all put into practice (and we do not see anything that should not be), should make the perfect salesman. Showroom salesmen, of course, are only human; and they, like the rest of us, fall short in perfection, both in respect of qualities and degree. But they also, like the rest of u can do their best to approach as near perfection as possible, and to maintain the standard attained, with constant endeavour to exceed it. Of course, we must start with the man himself. There are some men who could never get out of their ruts, and who have not the brains to enable them to improve. That such men are to be found in some showrooms is due more to those who employ them than to themselves. They would not be there if an adequate salary was offered which would attract men of brains; and men whose daily effort would be to make themselves worthy of their undertaking, of their position, of the recompense for their services, and of from time to time an advance of recompense. Unless showroom attendants have brains (and those having the management of gas undertakings should always make themselves responsible for the selection of men with brains, and so show in the result that they have themselves good judgment), all possible precept, no matter how plain and complete, is not going to do them much good. But given brains and aptitude, observation of the rules which Mr. Davis presents (and which are no doubt already practised by some attendants who have made a full study of their work and position) will produce a salesman such as it is always a pleasure for a customer to meet.

The Precepts.

Some of the hints may appear trifling; but trifles are the things that go to make for perfection. In connection with the personal hints, a soft-headed dandy is not what is wanted; but a presentable, well-dressed, well-mannered man. The man who has the mental equipment laid down in the rules is the man who, though well-dressed and presentable, will not be soft-headed; and he will have balance enough to enable him to keep free of the descriptive term "dandy." We see that Mr. Davis suggests that there is no need to disparage electricity in order to advance the interests and claims of gas. The more winning policy, he says, is: "Electricity is good, but gas is better." We agree. There is no need to disparage; but there is need to follow the advice given subsequently, that the salesman must be armed with accurate figures (memorized if possible) of the comparative costs of heating and cooking by gas and electricity. Without these, and without a knowledge of competitors, the showroom attendant to-day is seriously deficient in equipment. He must have the requisite knowledge to combat the statements of rivals, and, in doing so to "speak the whole truth, and nothing but the truth," of their commodity and applications. The gas showroom attendant may depend upon it that the electricity showroom attendant has poured his tale into the ears of the customer, or, if he has not done so, he will do so as soon as opportunity offers. The customer looking out for fires, cooking appliances, motive power, or industrial heating arrangements, primed with what he has heard at the electricity showroom, will be curious to hear what the gas showroom attendant will have to say on the subject; and the latter must be in a position (in reply to questions) promptly to offer facts which are capable of demonstration. A good showroom, economical and efficient appliances, and an excellent case available for gas, are reduced to futility by an unintelligent, unpresentable, ill-fitting attendant. The attendant must be the mainspring of the showroom, and his efficiency for the position must always be the measure of his own ability, perseverance, and uprightness.

The British Worker and Post-War Trade.

An article, full of thought and sound advice, on the "Problem of the British Worker," appeared in the "Daily Telegraph" last Tuesday. The author is Mr. W. H. Cowan, M.P. He holds very strongly to the view, which seems to be rather too generally overlooked, that the British worker must be an important factor in the coming new and strenuous industrial and commercial war. Therefore the productive capacity and efficiency of the worker must be considered. Physical strength and endurance are points of which sight must not be lost; and to this end reforms are desirable such as the substitution of hygienic for unhygienic surroundings, provision for physical exercises, and inculcation of regular and healthy habits. The improvement of our educational system as it affects the working classes is necessary. In those cases where the British worker suffers from such ills as lack of industry, listlessness, narrow-mindedness, and an imperviousness to new ideas, the fault lies largely with those who have neglected to provide him with the opportunities for acquiring that knowledge which will give him the key to the true significance of the work upon which he is engaged. It is suitable technical education to better fit the men for their work that Mr. Cowan has in mind; and the importance that he lays upon this matter as a factor in enhancing productivity is attested by his words: "Never at any time in the nation's history was the need for a properly co-ordinated system of technical education so sorely needed, and so earnestly to be pleaded for." Another point in enlarging the worker's productivity is a more intelligent co-operation between employer and employed. Again, the policy developed by trade unionism has tended to limit production; trade unionism needs to be re-educated; and its alliance must be obtained in the development of British trade. After-war trade development is as much a question for the British workman as anybody. Germany for years past has been, in her trade expansion schemes, curtailing the sphere and the earning power of British workers, and increasing those of German workers. This being so, all British workers should stiffen their backs, and add to the resistance against the resumption of Germany's not disinterested activities. There cannot be complete stoppage. But unity is strength, and much can be done by a united front.

Attainable Surface Combustion Temperatures.

A point which might mislead, but which was not noticed till after publication, occurred in the paragraph in last week's issue [p. 263] on an American test of a surface combustion furnace. The information given was communicated by the Director of the United States Bureau of Standards to the Franklin Institute. The Bureau is interested in the subject of surface combustion, owing to the ability to realize by it very high temperatures. Tests have been made; but the result of the particular test quoted is stated in a manner which may give an erroneous impression. The test was with a crucible furnace (in another place "muffle" is mentioned) using ordinary gas; and the result is presented thus: "The highest temperature reached was 1675°, at which point the muffle failed." It might be assumed from this that the highest temperature attainable by the surface combustion system is the one mentioned; but, as a matter of fact, we doubt whether even Professor Bone could tell the highest realizable temperature. There is a clear recollection (but the occasion has slipped from memory) that, in one of his surface combustion lectures, Professor Bone pointed out that the temperatures ascertained from experimental work were entirely limited by the heat-resisting capacity of the refractory material used. That the temperature of 1675° is low is evidenced by the records of the Franklin Institute itself, as seen in the succeeding paragraph.

Results of Experiments.

In a pamphlet reproducing the lecture that Professor Bone delivered before the Institute in 1911, there is this note: "Since this lecture was delivered in Philadelphia, a further experiment with the object of determining the maximum temperature obtainable by means of artificial illuminating gas has been tried. An alundum crucible of an extremely high refractory character containing a Seger cone No. 39 was completely melted-down, showing that a temperature approximating 2000° C. had been obtained." There is a substantial difference between the 1675° mentioned in last week's paragraph and the 2000° C. recorded in the quoted note.

Also, at the lecture which Professor Bone delivered before the American Gas Institute at St. Louis on Oct. 19, 1911, he very strikingly demonstrated the high temperatures attainable with surface combustion by melting platinum in a small crucible furnace on the lecture table in view of the whole of the audience, as the following official record, published in the Proceedings of the American Gas Institute [Vol. VI., 1911, Part I., p. 599] completely testifies: "As a final experiment, the lecturer placed a roll of platinum foil in a small crucible of very refractory material, which was then placed in a suitable cylindrical furnace containing a bed of refractory granular material. The mixture of gas and air was then injected, and caused to burn in the bed of granular material, speedily raising it to white heat. After about twenty minutes, the lecturer was able to announce the melting of the platinum. On removing and cooling down the crucible, the bead of platinum, somewhat larger than a full sized grain of wheat, was found at the bottom of the crucible, and exhibited to various persons in the audience. Subsequently, it was presented by the lecturer to the President as a memento of the occasion." Now since platinum melts at 1755° C., it is evident that, in order to melt platinum in twenty minutes from a cold start, Professor Bone must have produced in the experiment in question a higher temperature than 1755° C., which is itself 80° higher than the 1675° attained in the recent test at the United States Bureau of Standards when their muffle failed. We repeat that the temperatures realizable in furnace practice by means of surface combustion are limited by the refractoriness of the materials (crucibles, muffles, &c.) employed in constructing the furnace, and not by the possibilities of the combustion process itself.

PERSONAL.

Mr. A. E. Williams has been appointed to succeed Mr. G. M. Gill at the Stepney works of the Commercial Gas Company.

Mr. E. Fearon, Works Assistant at the Salford Corporation Gas-Works, has been promoted to the position of Superintendent of the Bloom Street Works. He was formerly at Sheffield.

There was gazetted on Jan. 25 (to date back to Nov. 5) the promotion of Major George S. Eunson to the rank of Lieutenant-Colonel in command of the 3rd/4th Northamptons. This reward of 26 years' good service has afforded great satisfaction to both officers and men under his command, as it has also done to those connected with the Northampton Gas Company, of which Colonel Eunson is Engineer and Manager.

The Stockton-on-Tees Corporation last Tuesday presented a framed illuminated address to Mr. William Ford, the late Gas Manager, recording high appreciation of the faithful services discharged by him to the town in this position over a period of almost 47 years. Mr. Ford, in returning thanks, said there was not a member of the present Council who was a member when he received the appointment of Gas Manager. Though he had now retired to the position of a consulting official, he hoped to be of considerable service to the Corporation for years to come.

We join in the hearty congratulations offered by the South Metropolitan Gas Company's "Co-Partnership Journal" to Mr. F. J. Bywater on his promotion to the rank of Major in the Royal Engineers. The Editor (Mr. W. T. Layton) says: "His rise from Second-Lieutenant to Major has been rapid, especially for a regiment in which so much scientific knowledge and administrative ability are necessary to the making of an officer. In these strenuous times, when we can ill spare any of our Engineers, it is consoling to reflect that the Company's loss is the Empire's gain."

Mr. James W. Roper has (subject to confirmation by the Council) been appointed by the Bradford Gas Committee as Manager of the Corporation Gas-Works at Valley Road, in succession to the late Mr. W. J. Dowse. Mr. Roper is one of the younger element in the Bradford gas undertaking, and has been with the department from the commencement of his career, fifteen years ago—the bulk of the time having been spent in laboratory work. He has been Chief Chemist for about six years, and has had practical experience of gas manufacture, having had temporary charge of three of the Bradford works at various times. Mr. Roper is lecturer in "Gas Engineering and Supply" at the Bradford Technical College. For some years past he has been a member of the Yorkshire Junior Gas Association, and has contributed to their "Transactions."

Mr. John E. Dudley, the Resident Manager of the Higginshaw Gas-Works, Oldham, has resigned his position owing to ill-health. He has been employed under the Oldham Corporation for a period of 38 years; the last 16 years being spent as Manager at Higginshaw. Last Wednesday evening, the stokers, &c., presented him with a gold mounted walking stick, umbrella, and pocket wallet, each of which was suitably inscribed. Mr. Tim Duxbury, the Chief Engineer, presided, and expressed, on behalf of himself and the men, their deep regret at losing Mr. Dudley's services, and they sincerely hoped he would soon be restored to his usual health again. Mr. Dudley had been one of the most faithful and conscientious officials of the Corporation, and has always made a special study of his work. Mr. J. Shill, foreman mechanic, in making the presentation, said how sorry they all were that Mr. Dudley had broken down in health, and especially that he had to give up his duties as Manager. Mr. Dudley, in responding, expressed his deep sorrow at being compelled to leave them. He thanked them most sincerely for the beautiful presents, and for their kindness to him at all times. He would always remember the 16 years spent at the Higginshaw Gas-Works.

OBITUARY.

Mr. Olaf Pihl, news of whose death on the 12th ult. has reached this country, was very well known as General Manager and Chief Engineer of the Christiania Municipal Gas-Works; and his decease will be widely mourned, not only in Norway, but also in this country, where he had many friends. Though in indifferent health for some time, his condition was not regarded as serious until two or three days before his death, when cerebral hæmorrhage developed itself. He was born in 1860; and his technical education took place at Christiania and Dresden. For several years he was connected with the Stettiner Chamotte Fabrik; and three years of his working life were spent at the Beckton Gas-Works. After being in charge for some time of the Drammen (Norway) Gas-Works, he formed the Norwegian Gas Company, having works at Christiansand, Arendal, and Aalesund; and after occupying for some years the position of Chief Engineer of this undertaking, he went in 1902 to Christiania, to take up the work which he continued until his death. For some time he had been busy with the question of erecting new gas-works.

Mr. A. C. Scrivener, of Birmingham, whose death last Saturday it is our sad duty to record, will be much missed; for his unfailing affability, his cheerful presence, and his thoughtfulness for others endeared him to all with whom he came in contact. As Agent for the Wigan Coal and Iron Company, Limited, he was best known among gas managers in the Midlands, by whom he was always regarded more as a comrade and as a friend than as the representative of a commercial firm with whom they were doing business. To such an extent, in fact, was this the case, that by such an exclusive body as the Midland Association of Gas Managers he was frequently welcomed as a guest at their excursion meetings—a privilege which was very gratifying to him, and one which was never made use of by him to advance his business interests. Mr. Scrivener, who reached his seventieth anniversary last June, had for a long time suffered from his heart, and been compelled to take things very quietly, though during the last week or so he had not been noticeably worse. He left home for business as usual on Saturday morning, but had only walked the hundred yards across the road to the station, when, as he was quietly entering the railway approach, he had a heart seizure and expired immediately.

A prominent and esteemed member of the French gas industry has passed away in the person of M. Joseph Ancel, for many years head of the Lyons Gas Company, and a Past-President of the Société Technique du Gaz, of which he was one of the founders. M. Ancel was born in Lyons, and always lived in his native town, where he took an active and leading part in the management of a number of commercial undertakings connected with the supply of gas. For forty-five years he was associated with the Lyons Gas Company, and was also a Director of the Compagnie Générale de Navigation and of the Compagnie pour la Fabrication des Compteurs. His presidency of the Société Technique (in 1883) marked the holding of the annual congress at Marseilles, on which occasion M. Ancel delivered an address which was characterized by his confidence in gas lighting in competition with electricity and his forecast of the directions in which the two would prove capable of assimilation under common management. He also rendered valuable help to the Société Technique in its work in connection with fresh applications of gas, the conditions of municipal concessions, and other professional matters. In 1912 he was the recipient of a special token of his contemporaries' regard in the shape of the bronze medal of the Société awarded to "bons ouvriers" of the gas industry; and in 1914 he obtained national recognition by being created a Chevalier of the Legion of Honour.

GAS-STOVES IN AIR-BRUSH WORK.

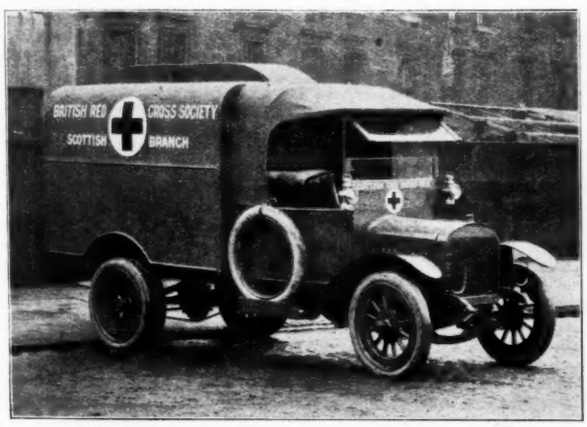
A recent issue of the "Journal des Usines à Gaz" [Jan. 5] contained a description of the gas appliances used in the manufacture of the steel helmets with which large numbers of the men in the French Army are now being supplied. In the factory of M. Dupeyron, in Paris, an installation of sixty gas blow-pipes is employed in soldering to the interior of the helmet the hooks serving to hold the head-piece and the strap of the helmet. The cost of the gas per helmet is found to be 0·0025 fr., equivalent to 1·40th of a penny.

In another factory, the helmets receive their final finish in the shape of a coating of blue varnish. This is applied not with an ordinary brush but as a fine spray produced by a battery of aërographs or air-brushes, such as are used in many industrial

operations, large and small, from the colouring and decoration of Christmas cards to the painting of gasholders and pieces of machinery. In the case of the application of a varnish, means require to be taken for the rapid and cleanly drying of the coated goods; and it is here that gas-heated stoves have demonstrated their great efficiency and economy. In the factory in which the army helmets are finished off to the number of 7000 to 7500 per day, three large gas-stoves have been installed, and have given great satisfaction on the grounds of the regularity and rapidity of drying, the entire freedom from dust, and the reduction of labour, owing to the avoidance of solid fuel and of the heavy work of bringing it into a furnace. The staff is composed entirely of women. Each stove consists of a wrought-iron chamber, 7 ft. in height and breadth and 3 ft. 6 in. in depth. A series of seven shelves accommodates 168 helmets. Each stove is heated in the lower part by eight rows of burners consuming from 3½ to 4 cubic metres (120 to 140 cubic feet) of gas per hour and raising the temperature of the chamber to 130° C. (300° Fahr.), at which drying is complete in about an hour. The cost of drying works out to 0·005 fr. (1·20th of a penny) per helmet.

THE "SCOTTISH GAS INDUSTRY" AMBULANCE CAR.

We reproduce a photograph of the motor ambulance car presented by the North British Association of Gas Managers to the Red Cross Society—Scottish Branch—as mentioned in "Notes from Scotland" to-day. The car has a "G.M.C." chassis, four-cylinder, 15 h.p. It was made by Mr. William Park, of Crawford Street, Glasgow.



The Gasman at the War.

Glancing from time to time over the contents of the magazines which several of the larger gas undertakings now publish for the benefit of their own employees, one can hardly fail to be struck by the high mark of excellence which is reached in many of the letters printed from those members who have joined the Colours and are either at the front or in training here. The writers see and do so many things which are of interest to their fellows who are not in khaki; and they appear not only to be good judges of what they should say, but to be able to say it well. This is a faculty to which we are pleased to see a writer in the "Manchester Guardian" recently paid generous tribute. He remarks that Germans who before the war flattered themselves that they had calculated to a nicety the whole of England's military resources, failed to notice the most significant figures they met. For instance, they forgot to send any report home "about the young, well-made man who, as they passed, was on his way to collect the pennies from an automatic gas-meter—a genuine gasman, not a Le Queux mystery in disguise, and yet emphatically one of the men who were to wreck the most elaborate Prussian schemes." He then goes on to make the point which has already been referred to—that "the romance of the war is to be found in the letters these men (civilians plunged into a soldier's life) send home; and, fortunately for future generations, many of the records are preserved in the monthly journals of those firms which send large numbers to the front." Special allusion is made to the "Co-Partners' Magazine" of the Gas Light and Coke Company; but the remarks would equally well apply to other publications of a similar character. The letters so well written are frequently tales of thrilling adventures—such as a gasman in times of peace would hardly dream of. In the case of the Gas Light and Coke Company, the first D.C.M. was won by a man from the Goswell Road Branch, who in happier times had been wont to keep high-pressure lamps in order. He is now a mechanic on a submarine. And only last week we recorded the case of a gas-fitter, trained at Hertford, who after a few days' service with the Basingstoke Gas Company was called to the Colours, and has had bestowed upon him the Victoria Cross. The industry is proud of its fighters.

COMMERCIAL GAS COMPANY.

Half-Yearly Report.

The following is the report for the six months ended the 31st of December, which the Directors of the Commercial Gas Company will present at the half-yearly meeting on the 17th inst.

The Directors submit the accounts for the half year ended Dec. 31, 1915. The revenue account shows a net profit for the half year of £72,760 6s. 10d., which, added to the balance of £65,623 19s. 1d. brought forward from the previous half year, produces a net revenue balance of £138,384 5s. 11d. Deducting £8838 15s. 8d. for interest, there remains standing to the credit of the net revenue account a balance of £129,545 10s. 3d. available for dividend. The Directors recommend the payment of the statutory dividends thereout at the rate of £4 18s. 8d. per cent. per annum upon the 4 per cent. stock of the Company, and of £4 13s. 4d. per cent. per annum upon the 3½ per cent. stock, both less income-tax. The balance of the net revenue will be carried forward to the next half year. Messrs. H. D. Ellis and H. W. Gell, two of the Directors, retire by rotation, and, being eligible, offer themselves for re-election.

—William Graham Bradshaw, Chairman.

Gas-Works, Stepney, Feb. 1, 1916.

The Accounts.

The accounts accompanying the report consist of the usual set of statements. They show that the paid-up stock on the 31st of December amounted to £996,405; that £1,076,875 had been added by conversion, making £2,073,280; and that £149,298 remained unissued out of the total authorized capital (including premiums) of £2,235,000. The total amount borrowed on the above-named date was £339,062 10s., and £135,937 10s. was added by conversion; making a total of £475,000, and leaving £79,226 to be borrowed out of the £550,000 authorized. Capital account receipts amount, with premiums, to £2,606,065 4s. 5d. The expenditure stands at £1,463,116 2s. 1d., with a nominal amount of £1,212,812 10s. added by conversion—together, £2,675,928 12s. 1d. There is thus a balance of £69,863 7s. 8d. carried to the balance-sheet. A sum of £4990 was expended during the half year on new and additional mains, services, stoves, &c., and £1380 on additional freehold land. The reserve fund amounted at the close of the half year to £40,859, and the insurance fund to £31,954.

The following is the revenue account:—

Receipts.

Sale of gas—			
Per meter (number in use, 115,860) at 2s. 8d. per 1000 cubic feet	£220,463 4 5		
Public lighting and under contracts	4,825 16 5		
	£225,289 0 10		
Less discounts and allowances	7,609 17 10		
		£217,679 3 0	
Rental—			
Meters (24,566)	£2,951 3 11		
Stoves (82,930)	13,169 2 10		
Prepayment meters and fittings (90,631)	17,930 11 10		
Maintenance of mantles and fittings	737 1 10		
		34,779 0 5	
Residual products—			
Coke, less £3586 1s. 10d. or labour	£45,275 2 11		
Breeze, less £882 7s. 5d. for labour	1,256 9 9		
Tar	10,337 4 9		
Ammoniacal liquor and sulphate of ammonia	13,307 4 3		
		70,176 1 8	
Miscellaneous receipts—			
Rent receivable	£0 10 0		
Transfer fees	23 15 0		
		24 5 0	
Total receipts		£322,658 10 1	

Expenditure.

Manufacture of gas—			
Coal and oil, including dues, carriage, unloading, and trimming	£121,668 3 4		
Salaries of Engineer and officers at works	3,111 0 7		
Wages (carbonizing)	11,610 6 6		
Purification, including labour	1,015 6 0		
Repair and maintenance of works and plant, materials and labour (less £72 16s. received for old materials)	30,717 7 10		
		£168,122 4 3	
Profit sharing		2,385 10 7	
Distribution of gas—			
Salaries and wages of officers (including rental clerks)	£5,960 5 3		
Repair, maintenance, and renewal of mains and services, material and labour	8,978 17 1		
Repair and renewal of meters	3,019 4 5		
" " " " stoves	11,648 8 4		
" " " " prepayment meters and fittings	11,299 14 6		
Maintenance of mantles and fittings	1,290 11 7		
		42,197 1 2	
Public lamps—lighting and repairing		2,754 19 3	
Rent, rates, and taxes		16,398 12 4	
Management—			
Directors' allowance	£1,250 0 0		
Company's Auditors	75 0 0		
Salaries of Secretary, Accountant, and clerks	1,002 0 5		
Collectors' salaries and commission	1,448 12 4		
Prepayment meter collection	4,089 17 4		
Stationery and printing	1,221 18 0		
General charges	2,820 12 0		
		11,908 0 1	
Bad debts		373 12 7	
Law and parliamentary charges		105 3 4	
Superannuations and allowances and Workmen's Benefit Society, &c.		2,531 5 1	
Official officers, &c.		163 19 2	
National Health and Unemployment Insurance		492 7 11	
Allowances to employees on active service		2,460 7 6	
Total expenditure		£249,898 3 3	
Balance carried to net revenue account		72,760 6 10	
		£322,658 10 1	

The following statements relate to the working:—

Statement of Coal and Oil.

—	In Store June 30, 1915.	Received During Half Year.	Carbonized During Half Year.	Used and Sold During Half Year.	In Store Dec. 31, 1915.
	Tons.	Tons.	Tons.	Tons.	Tons.
Coal	25,173	97,466	92,755	705	29,179
Oil—gallons . .	352,435	1,429,635	1,307,683	..	474,387

Statement of Residual Products.

Description.	In Store June 30, 1915.	Made During Half Year.	Used During Half Year.	Sold During Half Year.	In Store Dec. 31, 1915.
Coke—tons	2,191	57,972	6,224	47,882	6,056
Breeze—tons.	4,112	6,511	..	5,873	4,750
Tar—gallons.	417,078	1,221,823	..	1,086,942	551,959
Ammoniacal liquor—butts of 108 gallons	6,077	31,148	28,992	..	8,233
Sulphate of ammonia—tons	130	949	..	954	125

Statement of Gas Made, Sold, &c.

Quantity Made.	Quantity Sold.		Quantity Accounted for.	Number of Public Lights.
	Public Lights and under Contracts (estimated).	Private Lights, per Meter.		
Thousands.	Thousands.	Thousands.	Thousands.	
1,882,495	23,066	1,654,317	1,705,619	3820

The last statement is the balance-sheet, which gives the value of the stores in hand at the close of the half year as follows: Coal, oil, &c., £36,311; coke and breeze, £5947; tar, ammoniacal liquor, sulphate of ammonia, &c., £10,873; sundry stores, £41,031—total, £94,161. The figures this time last year were: Coal, oil, &c., £23,403; coke and breeze, £3128; tar, ammoniacal liquor, sulphate of ammonia, &c., £10,725; sundry stores, £36,606—total, £73,862.

ELECTRICITY SUPPLY MEMORANDA.

MUNICIPAL electricity supply finance is always an interesting topic—sometimes even fascinating. The "Electrician" is fascinated by it just now, and is setting itself up as an expert adviser on the subject. A business, under any circumstances, should not, we gather from the argument, be run as a whole; but there should be division. Whatever the prevailing conditions, each division should be made to pay for itself; and no division should be called upon to bear losses incurred by any other division. Our contemporary lets itself "go," and refers to the "rottenness" of the finances of certain municipally-owned electric generating stations. The expression is an emphatic one; and, although we are averse to the use of strong language, the term quite accords with our own views. But what worries our contemporary just now is that municipal electricity committees continue to propose and to inflict increases of price on the ordinary electricity consumers; and this is considered very wrong, though to be honest municipal electricity undertakings should pay their own way, the same as any other business concern. Brighton is the illustration. On several occasions, the Corporation have made appropriations from the electricity profits in aid of the rates. Not all electricity concerns are in the happy position of having profits from which appropriations can be made; and many are the electricity undertakings that have had to draw upon the pockets of the ratepayers for maintenance. We do not like profit appropriation for aiding the rates; and we do not agree that it is honest to rob the general body of ratepayers for supporting a municipal trading concern. We cannot without research say positively whether the Brighton electricity undertaking has ever indulged in plundering the ratepayers, in order to supply its own financial deficiencies. Whether or not it has done so, two blacks do not make a white. If it is "rotten" to so appropriate profits, it is "rotten" to make people pay for losses which they have had no part in producing. The position with electricity is not the same as with a universal water supply.

"Rottenness."

But the point of the argument is this. The "Electrician" states that considerable expenditure has been incurred in providing plant for lighting the streets by electricity. This plant our contemporary apparently does not regard as an integrant of the undertaking. But it would have it treated as a separate fraction, and, while having practically no street lighting, it would make the ratepayers generally (though generally they have not desired the plant) answerable for all the usual expenses associated with it. The ratepayers would not, by this monitor as to the correct principles of business finance and management, be treated as the customers of an ordinary trading concern; but it would tax them for something that they have not had. The argument is a strange one. The plant, it is stated, is of no use till such time as street lighting can again be indulged in on an "extravagant" scale. The admission as to extravagance will not please those responsible for the Brighton Electricity Department. However, it is held that "the attempt to saddle consumers with any part whatsoever of the losses brought about by the absence of street lighting is unjust." Next we shall have our contemporary arguing, contrary to electrical practice, that it is unjust to saddle private lighting consumers with any part of the capital, depreciation, and managerial charges associated with the provision of plant and energy for power purposes, which plant in some stations has outrun that needed for lighting purposes. It was Mr. Horace Bowden, of Poplar, who was saying the other day that not a few electricity undertakings cannot make both ends meet during the summer months, and so have to rely for compensation upon the income received from heavy priced lighting units during the winter months. The only rational way of treating a business enterprise is as a whole, and not as though it was made up of water-tight compartments. But in so treating it, there should be fairness to each class of consumer, though no person should be charged for what he does not have. Gas companies do not charge the local authorities anything for the gas manufacturing plant that is less fully employed owing to the absence of a large part of the public lighting. No charge is made for gas unconsumed; all that the local authorities are asked to pay are the expenses connected with the maintenance of the lamp columns, lanterns, and burners in a condition for use as soon as required. Gas companies, however, have no power to ask that the ratepayers should be taxed for the losses due to the lower consumption of gas and to the idle or less fully-used manufacturing plant.

The Private Consumer and Public Lighting.

A few words more about Brighton, principles, and other things. Our contemporary says: "The endeavour to adopt a rebate tariff, beginning with 5½d. per unit, is an impudent one; for at a time like the present there is no reason why big hotels, places of entertainment, and large shops should not bear their fair share of the cost of the undertaking. This fair share per unit is found by dividing the whole of the fixed charges (less street-lighting charges) by the number of units sold." But what about load, diversity, and other factors that it is asserted are taken into account, but actually are not always nowadays, in order to arrive at a mathematically correct charge? If the simple unadulterated plan advocated by the "Electrician" for ascertaining the amount of the fixed charges to be borne per unit in times of war is correct, then it would be right for peace times, and for all purposes—always. In another place our contemporary refers to our statements, in a previous reference to Brighton, and the question of public lighting charges [*ante*, p. 192], that the Gas Company are also suffering from reduced public lighting, that private enterprise has to fight its own battles, and that municipal enterprise is nursed at the expense of the general ratepayers' pockets. Our contemporary remarks that these statements need some slight correction, and adds: "May we remind our contemrary (though in the main correct) that private enterprise does not run the risk of the confiscation of its profits for the relief of rates as do so many municipal undertakings." There is a lot of confiscation of the profits of gas undertakings going on by local governing bodies. It is often found that, while gas undertakings are assessed for rating purposes to the tip-top level, municipal electricity undertakings are not. It is often found, too, that where municipal electricity undertakings exist, gas undertakings are not allowed to make any profit from public institutions, but all the business is transferred to the electricity concerns. Further confiscation of profits takes place by relieving the gas undertakings of the whole, or the main part of the public lighting, and passing it over to the municipal electricity department, without any consideration for the large outlay involved in making the change, or whether the streets are more efficiently and economically illuminated. Profit appropriation in aid of the rates does not by any means end the comparison. Electricity undertakings have not suffered to the extent that municipal gas undertakings have done from this very vicious policy. Look at Manchester. The aggregate amount of gas profits that have been transferred to aid the rates would have more than repaid the whole of the outstanding capital of the undertaking. Just think of this—a capital-freed gas undertaking at Manchester. Forsooth, the Electricity Department of the city to-day would have had a bad time in the competition, if there had been no gas profit appropriation. Therefore, we have no doubt Mr. Pearce, the Electrical Engineer, while strongly objecting to the principle of profit appropriation, has good cause to privately bless the fact that it has been so lavishly exercised in relation to the gas undertaking.

A Simple Plan and a Slight Correction.

Not long since, reference was made in the "Memoranda" to the paper read by Mr. Wilkinson, before the Scottish Section of the Institution of Electrical Engineers, on the use of thermostats in connection with the electrical heating of rooms, in order to economize, which is extremely necessary with such a low thermal value agent as electricity. The "Electrical Review," in their last issue in January, published a report of the discussion which took place on the paper. Some

Variability of Cost.

interesting statements were then contributed by Mr. W. W. Lackie, which pointed to two things: First, that the outlay for electricity in one house cannot be taken as any criterion of what the cost will be in another house of the same dimensions; and, second, that, in using thermostats for controlling the temperature of rooms, great care must be taken as to the position in which they are located. In the first place, he stated that in November, 1914, the Glasgow Corporation rented premises for the administration of the Prince of Wales' Relief Fund; and the Electricity Department were given the work of heating. The principal apartment was 60 ft. by 36 ft. by 12 ft. high; the total capacity being about 25,000 cubic feet. By arranging radiators alongside individual desks, he states, that ample heating was provided by an installation taking a total of 10 KW. The premises were occupied for practically a year; and the consumption of energy was 17,000 units, which at ¾d. per unit, gave a bill of about £55, or £5 10s. per KW. installed. And quite enough too. The radiators were not in use for 365 days; and Mr. Lackie omits to mention how many hours they were actually running during the year. Then he referred to the electrically equipped bungalows in a Glasgow suburb. The size of these varies from only 7000 to 12,000 cubic feet, and each house has from 10 to 12 KW. of electric heating appliances, including water heaters. The largest consumption of any one of these houses was for the year ending May, 1915, 14,000 units; the bill being £40. This only works out to an average of 0·685d. per unit. In other cases, he states, the annual consumption was only half of this. Speaking broadly, however, the consumption of electrical energy in a house, he finds, may be ten to fifty times what it would be if current was only taken for lighting. Further, in Glasgow there are 10,000 domestic consumers; and 2500 of these have heating appliances of some kind—the total consumption for lighting being 500,000 units, and for other purposes twice this amount. Again, a "large number" of street lavatories in Glasgow have water-heaters installed, taking from 3 to 10 KW. each. The annual bill for these varies from £7 to £30 per annum depending on the work to be done, about which no information is reported. There are no complaints as to the cost; and no "serious" trouble with the apparatus. It may be assumed that the lavatories are under the control of the Corporation; if so, we are not surprised there are no complaints regarding cost. As to trouble with the apparatus, "serious" is a term which has different significance with different people, and according to their interests.

Ventilation, and Thermostatic Control of Heating.

Mr. Lackie went on to relate certain experiences, as given to him by Mr. Goslin the Electrical Engineer to the Glasgow Corporation Tramways, with regard to electric heating at the head office of the department. Mr. Goslin finds that the question of electric heating is bound up with that of ventilation. Where the heating is adequate without provision of ventilation, complaints are soon heard of dry throats, and other forms of discomfort and irritation. We are not surprised. This points to an excess of convected heat, and the drying of the atmosphere. Mr. Goslin believes in thermostatic control for the purpose of saving current. Without thermostatic control, he says, a room may become heated to (say) 74° Fahr.; whereas with automatic control it may be maintained at (say) between 59° and 60°. But apart from the interest, not to say usefulness, of the information as to ventilation in association with electric heating, the results of an experiment in a room as to the placing of thermostats for the purpose of controlling the temperature are instructive. In the room, Mr. Goslin placed 36 thermostats, at different heights and in different positions. He found that there was as much as 10° difference of temperature between a place near the ceiling and one near the floor-level; also that there was a difference of 5° between the temperature near a window and that of an adjacent wall. This points to the fact that the thermostat must be very carefully placed in a room, or the temperature in the living part may not be that required. Mr. Goslin also established the very practical fact that one watt-hour raised 100 cubic feet of air 1° Fahr. He recommends large low-temperature heaters and automatic air-regulators.

Southern District Association of Gas Engineers.—The March Meeting of the Association will, the Hon. Secretary (Mr. H. C. Head, of Winchester) states, be held at the Hotel Cecil at 2.30 on the 16th prox. Afternoon tea will be served; but the Committee have decided that, owing to the war, it is not desirable to have the annual dinner.

"Transactions" of the Société Technique.—The volume of proceedings of the Société Technique du Gaz en France, for 1914 (prepared under such disadvantageous circumstances) has been received. It contains a report of the proceedings at the forty-first annual congress, which took place in Paris on June 18 and 19, under the presidency of M. Auguste Boutan, Managing-Director of the Lyons Gas Company. The compilation under present circumstances of a book consisting of nearly 900 pages, and with 25 plates, reflects great credit upon the officials of the Society—particularly the Secretaries (Messrs. Rolland d'Estape and G. Gautier). Extracts from most of the papers reproduced in the volume were published in the "JOURNAL" immediately following the meeting.

IN THE INTERESTS OF GAS—A PLEA FOR SHOWROOM REFORM.

By CYRIL G. DAVIS.

[SECOND ARTICLE.]

HOW ATTENDANTS MAY CO-OPERATE.

IN one of the many encouraging letters evoked by my former article ["JOURNAL," Nov. 2, 1915], appeared a suggestion that I should utilize the present opportunity to "draw attention to the enormous use the showroom can be in educating the whole of the employees of a gas undertaking;" and this excellent point adds another and potent argument to those which I have endeavoured to formulate in favour of securing a high standard of showroom maintenance.

My present purpose, however, is to try and enlist the co-operation of showroom attendants in the worthy cause of showroom reform; and to suggest that, by doing all they can to promote the interests of gas and the undertaking they serve, they will most assuredly enhance their individual reputations and material prospects.

SELF-HELP FOR SHOWROOM ATTENDANTS.

There is no reason why any gas showroom attendant with "his heart in his work" should not find in his daily environment both the inspiration and the opportunity essential to a successful career. Indeed, progress may well be rapid for one able to absorb all that showroom experience may be able to teach; for good work in the gas showroom may well prove to be a stepping-stone to a higher position. It is to assist eager aspirants to realize such a legitimate ambition that the accompanying hints, touching on personality, demeanour, mental equipment, and the psychology of selling, are now tendered.

PERSONAL.

Cultivate smartness in appearance. This involves a wholesome regard for personal cleanliness—for well-cared-for teeth, trimmed nails, and hair tidiness. Observation tends to show that these hints are not in all cases superfluous.

Be careful not to allow your finger ends to become cigarette stained. If you *do* smoke cigarettes, use a holder.

Dress as well as your means will allow, rather better than worse. By observing what it is that pleases you in the dress of others, you may best judge what is becoming to yourself. Quietness, dignity, and good taste, invariably characterize the toilet of the well-dressed man.

A clean shirt and collar, well-polished boots, a neatly arranged tie, a front-and-back crease in your trousers, the daily use of a clothes-brush—these may be details; but they are important, in that they all make for smartness in appearance and collectively sustain one's business *morale*.

Do not change into an old coat when you get to business in the morning. To do so shows a disrespect for your job, and in any case is false economy.

By creating the impression that you are a highly-paid man, you will enhance the importance of your own opinions and statements, and (who knows?) may even show an intelligent anticipation of Fortune's intention towards you.

Be proud of your showroom, and make your showroom something to be proud of. That is to say, elevate the prestige of your job, and do not be trammelled by its supposed limitations. In this connection gas managers will find it to their own advantage to afford showroom attendants as much scope for initiative as they individually deserve.

A FEW AIDS TO SELLING.

Have an eye to the attractions of your showroom. Periodical re-arrangement imbues even a permanent display with novelty and freshness.

See that everything in your showroom is kept in apple-pie order. One blemish may suffice to hide any amount of perfection.

Never leave the showroom unattended. You know the impression you get when you go into a shop yourself and find no one there to serve you.

Do not loiter at the showroom entrance when "business is quiet." Many a would-be customer has been kept out of a shop by the salesman's own obstruction of the doorway.

If you cannot get to the door in time to open it for a visitor, at least be there to accord a respectful welcome. A bright and cheery reception tends to put the caller in a buying mood. Never allow the visitor to open the door when leaving.

Have plenty to say to visitors. Gas is an interesting business, and enthusiasm is highly infectious.

Avoid the stereotyped "What can I do for you to-day, Madam?" "Madam" has been asked that so often. "What may I have the pleasure of showing you?" is a courteous and more appropriate introduction.

Let the visitor be made to feel that you are taking a keen personal interest in his or her requirements. The average response will be worth all the effort.

When the inquiry is for a gas-fire, show an intelligent apprecia-

tion of the visitor's requirements by asking the size of the room to be heated, the windows in it, and whether it is a reception room, bedroom, or nursery. Large fires should be recommended for bed-rooms and dining-rooms, which require to be comfortably heated in as short a time as possible. If the object of the call is a gas-cooker, it is equally important to know for what number the stove is intended to cook.

Do not tire your visitor, and do not get impatient yourself. It should be your aim to put him or her under as much obligation as possible by the trouble you go to, and to create the impression that the employees of the undertaking you serve are *eager* to assist customers in their difficulties. Visitors to a gas showroom are sometimes very trying; but patience and tact in your attention to them will bring its reward, though perhaps only indirectly.

Indifferent showroom attendants sometimes allow their patience to become exhausted, and in a spirit of pique leave the visitor to saunter around the showroom unattended. This attitude is distinctly wrong, and the very antithesis of good salesmanship.

Do not let it be necessary for the lady to "talk it over with her husband." This usually means that she has not been satisfied with what she has been shown and told.

"Pressure to buy" in the ordinary sense is played out. Rather put the case for gas in such a way that the visitor is made to feel that there is something to lose by not doing business.

Remember that a consumer who has come about a cooker is also a possible hirer or purchaser of a gas-fire, geyser, circulator, radiator, or other gas-using apparatus. You may not "get in" all these at one time, but you can sow good seed.

If you do not effect a sale (the cleverest salesman cannot do business in every case), see that the visitor takes away something, be it only a pamphlet—*plus*, of course, a good impression—as a gas reminding souvenir.

It should not be difficult for you to elicit the name and address of your visitor. This done, follow up an abortive call with a timely letter, so worded as to create the impression that you have been "worrying about it." If one letter does not suffice, try another later.

Be courteous and obliging, even to the humblest visitor; and do not forget that the unassuming lady you are about to greet may prove to be closely acquainted with some influential person. This does not imply obsequiousness, which to the average person is as repellent as rudeness.

Try and overcome whatever diffidence you may feel concerning yourself and your abilities. The gas showroom is no place for the bashful man.

Study human nature. You will encounter all "sorts and conditions" in the gas showroom, and ready ability to understand a visitor is a wonderful help to successful salesmanship.

Be cheerful and optimistic in your interviews. The "doleful demeanour" is fatal to business.

Put all the earnestness and vim into your work that you possibly can. Healthy vitality is always impressive.

Sympathize with complaints, and humour the aggrieved. It may be a consumer's "own fault;" but it is never tactful to emphasize this aspect of the case.

Be always willing to call on a consumer—in your "own time" if need be—to advise on any gas matter. It may be extra work; but it is also extra experience.

There is no need to disparage electricity in your efforts to advance the claims of gas. A more winning policy is: "Electricity is good; but gas is better." Gas has plenty in its favour to warrant this good-natured tolerance.

Aim at progressive returns. Last year's figures should be this year's minimum.

Be honest in all your statements and transactions. Honesty is the basis of confidence; and confidence begets business.

Mental Equipment.

n the gasshowroom, as elsewhere, knowledge is power. Learn your stock; why it is there; what it will do; what space each item will occupy in domestic position; how much gas it consumes; and so on. And be instantly ready with the hire rates, cash prices, and hire-purchase terms, as the case may be. It is only inefficiency that has to "go and inquire."

Such information as you find it impossible to keep at your finger's ends have carefully entered in a properly indexed waistcoat pocket-book, ready for immediate reference.

Arm yourself with accurate figures (memorized, if possible) of the comparative costs of heating or cooking by electricity and gas. These (which can be had for the asking from the Information Bureau of the British Commercial Gas Association, 47, Victoria Street, London, S.W.) are convincingly in favour of gas.

Cultivate mental agility with figures. The ready calculation of a percentage has effected many a sale.

Use quiet intervals—if opportunity permit—for studying gas textbooks. There is a handy manual entitled "Competition Points for Gas Salesmen," which every showroom attendant should read and study.

While not foregoing judicious recreation, utilize your spare time, also, in developing your mentality. Preparation of this kind will increase your self-respect, and must sooner or later react on your prospects.

Read the trade papers regularly, and thus keep abreast of gas developments. Something may even be learnt from the advertisement pages.

Lastly, instead of relying on a timid application for a "rise," rather make your claims to preferment so obvious that they cannot be overlooked without injustice.

To Sum Up.

The characteristics which the aspiring showroom attendant will find it to his enduring interest to cultivate may be stated as follows:

Smartness in appearance; respect for his job; unfailing courtesy, patience, and tact; sound business judgment; conversational skill; mental alertness; cheery optimism; transparent honesty; justifiable self-confidence; intuitive appreciation of others' foibles; enthusiasm for gas; mastery of gas facts; tenacity of purpose; eager desire for self-improvement; and, not least, the imaginative faculty.

This may strike the reader as a somewhat formidable schedule, yet the qualities essential to success in this, as in almost any walk of life, are so closely co-related that one might crystallize them all in a single comprehensive requirement—viz., *unflagging interest in one's daily work*. Given this, in nine cases out of ten, all else proceeds.

And with this healthy spirit animating the staffs of the many gas showrooms up and down the country, who will say that gas and all associated with the advancement of the industry would not be held in higher public esteem?

CONSOLIDATED GAS COMPANY BUILDING.

Some time ago there were given in the "Journal" illustrated particulars of the new eighteen-storey building, approximately 300 feet long, which has been provided by the Consolidated Gas Company of New York, to meet the pressing requirements of the Company and all the allied gas and electric undertakings. The building has been designed on extremely generous lines in every respect. That we had already known. But it has been still further impressed upon us by the receipt of a descriptive book, of which it may be said that it is worthy of the building with which it deals. The photographs—and there are about fifty of them—are of the best; while the letterpress is brief, and to the point. In the general get-up of the book, good taste, as well as good workmanship, shows itself. A gas company with evidence of this kind at its hand needs no more to maintain the justness of its claim to be regarded as enterprising. It was proof of enterprise to erect the building, and it is further proof of enterprise to publish so luxurious an account of it.

With an eighteen-storey building 300 feet long, there is, of course, a good deal of space—both inside and outside. While convenience and comfort have been everywhere studied in respect to the interior, the claims of the exterior have by no means been overlooked. The rear and easterly walls are carried up with a light and dark shade of buff brick, forming panels, thus relieving the flat effect which is so often noticeable in tall buildings. The architectural features have been designed, too, with a view to night illumination; the ornamentation of the stone work and the iron grille in the upper storeys containing receptacles for numerous lights. The steel structure was designed by the Company's engineers; the total weight of the steel used in the framework of the building being 6600 tons. All the connections were drilled and riveted; and the work was so accurately dimensioned that even in placing the 60-ton girders at the top of the building, drifting and reaming were unnecessary. The main entrance is all in marble and bronze; and customers having business to transact pass through handsomely appointed display rooms on their way to the clerical department. There are display rooms for different types of apparatus; considerable space in the basement being devoted to fuel appliances.

The large volume of gas used in the building for power, light, and heat requires a separate room for the meters; and hot water is supplied from a battery of automatic gas water-heaters. In connection with a large restaurant for the employees, there is a complete gas kitchen equipped with the most modern appliances for the demonstration of domestic and hotel cooking; and there is also a smaller kitchen where all the cooking is done by electricity. Excellent provision is made for lectures and meetings; and the "minor" conveniences include a barbers' shop for the benefit of the employees. The building is piped for gas throughout; and a large advertising sign is placed on the roof. When illuminated by the 4000 lamps placed in the 15-feet letters, this sign can be read for many miles. Truly, they do things on a big scale in America.

It was mentioned in the opening of this article that some illustrated particulars of the building had already appeared in our pages. These will be found in the issue of the "Journal" for Feb. 17, 1914 [p. 426].

The February issue of "A Thousand-and-One Uses for Gas" has on the front page an illustration showing the part gas plays in shell-making from start to finish. It is an industrial fuel number, and contains a special article by a Furnace Expert based on the paper recently read by Mr. B. W. Brooks before the London and Southern District Junior Gas Association.

THE UTILIZATION OF ENERGY FROM COAL.

By Professor WILLIAM A. BONE, D.Sc., Ph.D., F.R.S.

At the Royal Institution last Thursday, Dr. WILLIAM A. BONE, F.R.S., Professor of Chemical Technology at the Imperial College of Science and Technology, delivered the third, and final, of a series of lectures on the above subject. The two previous lectures appeared in the "JOURNAL" for Jan. 25 and Feb. 1, pp. 206-208 and 253-256 respectively.

Of all directions in which we may look for the achievement of further great economies in coal consumption, probably none are more promising than those of power production on a large scale, and in the iron and steel industries. Therefore, I purpose to deal more particularly with these two aspects of the fuel question in this, my concluding, lecture. Inasmuch as I cannot do more than touch upon these subjects in a general way, and want to avoid as far as possible the use of technical terms and expressions, so as to bring the broad facts of the situation home to the lay mind, I must ask my professional *confrères* to view with leniency any departures that I may make from the orthodox way of presenting such a subject to an audience of technical men.

POSSIBLE ECONOMIES IN POWER PRODUCTION.

The total available energy in coal varies according to its character and its ash content; and it is usually expressed in terms of heat units per unit weight of the dry fuel. Here I would like to suggest that coal, which is intended to be used for power and heating purposes, should be sold in this country, as it is in America, on a calorific basis. The introduction of such a reform is not only reasonable, but it would also bring the sales of fuel for large-scale power and heating purposes more under supervision and control, and would accustom the user of coal not only to demand a certain calorific standard in the fuel he is buying, but also to ascertain what portion of the total available energy he is utilizing.

We shall not be far wrong in assuming for our present purposes that the heat equivalent of the available energy in 1 lb. of a good average coal is 13,000 B.Th.U. Inasmuch as the heat equivalent of a horse-power-hour is 2564 B.Th.U., it follows that, were we able by any means to transform the available energy in coal into mechanical power without loss of any kind, we should obtain a horse-power-hour output of work by the expenditure of about 0·2 (one-fifth) lb. of coal.

Now, according to Mr. Beilby's estimate, 52,000,000 tons of coal were consumed for power purposes in the United Kingdom during the year 1903, and the average consumption per horse-power-hour was no less than about 5 lbs. This means that we were then only converting on an average about 4 per cent. of the available energy of the coal burnt into useful work; the other 96 per cent. being wasted.

There are two principal ways in which we may convert the energy of coal into mechanical work. One is by raising steam in a boiler and then utilizing as much as possible of the energy of the steam in some form of steam-engine, either of the reciprocating or turbine type; the other is by gasifying the coal completely in some form of gas-producer, where the incandescent fuel is converted into a mixture of CO_2, CO, H_2, CH_4, and N_2, under the action of a steam and air blast, and then burning the resulting gas in an internal combustion engine. Both these methods are imperfect, of course; but it may perhaps be of interest if we compare them from the point of view of thermal efficiency.

In the first place, the thermal efficiency of a good modern type of coal-fired boiler is not far short of that of the gasification of coal in a gas-producer, where allowance is made for the fact that it is necessary to clean and cool the resultant gas before it is delivered to the engine. We shall not be far wrong in putting down the efficiency of each method under good working conditions at about 75 per cent. Now, under favourable working conditions, a gas-engine will convert about 27 per cent. of the energy of the gas supplied into available horse power; so that the coal consumption required to obtain a shaft-horse-power-hour by means of the combination of an efficient gas-producer and a gas-engine need not be more than 1 lb.

$$\frac{0{\cdot}20}{0{\cdot}75 \times 0{\cdot}29} = 1 \text{ lb.}$$

In the year 1903, to which Mr. Beilby's estimate applied, the best gas systems in operation did not require, when working at full load for twelve hours a day for six days a week, a consumption of coal at the producer of more than about 1 lb. per brake-horse-power. Hence it would appear that about four-fifths of the 52,000,000 tons of coal burnt that year for power purposes might possibly have been saved had the most efficient gas systems been universally employed and worked at nearly full load under the most favourable conditions. At that time the efficiency of the best type of reciprocating engine was not more than about 15 per cent.; so that the combination of a steam-boiler and engine did not then convert more than from 11·25 per cent. of the available energy of the coal into shaft-horse-power. Therefore the coal consumption of the best "reciprocating" steam system would be about 2¼ lbs. per brake-horse-power-hour.

$$\frac{0{\cdot}20}{0{\cdot}75 \times 0{\cdot}1125} = 2{\cdot}37 \text{ lbs.}$$

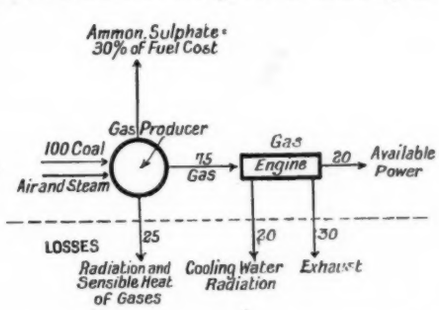
From this it is evident that about one-half the coal consumed for power purposes in the year 1903 might have been saved by the universal adoption of the best steam systems.

Since 1903, however, great advance have been made in the development of the steam-turbine; and, according to the published results of trials on the new 35,000 H.P. Parsons turbo-alternator erected at the Fisk Street Power station in Chicago, the fuel consumption on so large a turbine steam set (assuming a boiler efficiency of 75 per cent.) has now been reduced to 1 lb. of coal per horse-power-hour;* so that there is now probably little to choose between the thermal efficiencies of the best types of steam and gas systems, each working under the most favourable conditions. Inasmuch as each system can now, under its respective best working conditions, generate power with a coal consumption of not more than 1 lb. per horse-power-hour, it is evident that, if everything approaching the truly appalling average consumption of 5 lbs. per horse-power-hour estimated by Mr. Beilby for the year 1903 (or even half this figure) holds good to-day, there is still room for enormous economies. No doubt the position has improved on the whole since the year 1903; and until definite data are available for 1913 it is difficult to say what is the possible margin of fuel economy in power production to-day. But it is probably not less than 20,000,000 tons per annum, and may be considerably more.

Broadly speaking, the solution of the power problem involves several separate considerations. First of all, of course, there is the question of the relative thermal efficiencies of the different systems of converting the energy of coal into available power. But this is by no means the only, or in the majority of cases the most important, consideration. Equally, and sometimes more, important is the further question of the general planning and organization of a power scheme in regard to capital outlay, running costs, and other conditions of a local character. The question of the ultimate net cost of the power, including cost of fuel, labour, supervision, interest, redemption, and depreciation, must always be the main and over-ruling consideration in any given case; and it by no means follows that the most efficient system from a purely thermal point of view will, under any given conditions, be necessarily the cheapest in the long run.

Bearing this in mind, I may now point out certain considerations relative to the rival claims of gas and steam systems in respect of the fuel problem at the present moment. Some years ago, it appeared as if the combination of the gas-producer and internal combustion engine would soon out-distance the boiler and steam-engine, partly because of the then much superior thermal efficiency of the internal combustion engine, and partly also because of the capacity of the gas-producer to gasify low-grade coal under ammonia-recovery conditions—two very important considerations. It must be remembered that a great deal of coal obtained by the miner is so inferior in quality that it does not usually pay to bring it up to the surface, and it is therefore left below in the mine; and it is claimed—quite rightly I think—that the gas-producer is more capable than any form of boiler of dealing with such inferior grades of fuel, and, moreover, can gasify it under ammonia recovery-conditions. On the other hand, the capital outlay and the ground area involved in the erection of an ammonia-recovery gas-producer plant, as compared with a boiler installation, have hitherto formed formidable obstacles to the extension of the system. Attempts are being made, which I trust will prove successful, to overcome this disadvantage; and a type of ammonia-recovery plant is now offered to the public which claims to have succeeded. If the result of independent investigation and a sufficiently long experience of its working confirm this claim, an important step forward will have been achieved.

The following diagram shows approximately the net efficiency (coal to brake-horse-power) of a gas-producer internal combustion engine combination. Calling the coal energy to be debited against the system 100, the items to be credited to it under full working conditions are 20 in respect of brake-horse-power, and an



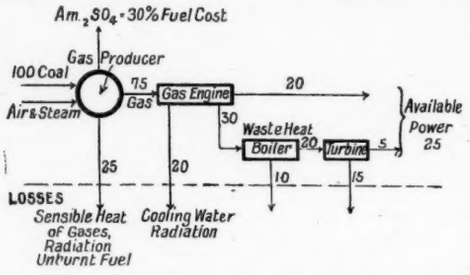
amount of ammonium sulphate the net profit on which may be put as equivalent to about 30 per cent. of the cost of the coal gasified. Of the energy losses involved per 100 coal energy, 25 are in respect of radiation and sensible heat of the hot gas at the producer, and approximately 50 at the gas-engine—20 in respect

* During the trial in question, working with steam at 200 lbs. gauge pressure and 200° Fahr. superheat, with a vacuum of 29 inches, a shaft-horse-power-hour was developed for a steam consumption equivalent to 9600 B.Th.U., which, assuming a boiler efficiency of 75 per cent., would be equivalent to a boiler consumption of 1 lb. of coal of a net calorific value of 12,800 B.Th.U. per lb.

of loss in cooling water and radiation, and 30 in respect of the exhaust gases.

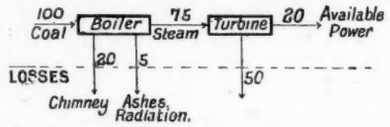
Now, it is possible to improve this result by coupling the engine exhaust to some form of waste-heat boiler. In connection with my investigations upon surface combustion in relation to steam raising, we evolved a type of multitubular waste-heat boiler in which the exhaust gases from an internal combustion engine are passed through tubes packed with granular material, the effect of which is to bring about a very rapid heat transmission between the hot gases and the water in the boiler, so that a considerable proportion of the energy in the exhaust gas is quickly transferred to the water and is obtained in the form of steam. Assuming it to be possible in this way to reduce the temperature of the engine exhaust (say) from 600° to 200° C., and to generate steam at 60 lbs. pressure for a turbine, the total brake-horse-power efficiency of the system might be increased from 20 to about 25 per cent., as shown in the next diagram.

Turning, now, to the results obtainable from the combination of coal-fired boiler *plus* turbine, which are shown diagrammatically in the next slide, it is seen that against the debit of 100 in respect of coal energy the only credit is 20 in respect of available



power, assuming 27 per cent. as the turbine efficiency. There is no possible credit in respect of ammonium sulphate, and, moreover, the boiler must be supplied with a good grade of fuel.

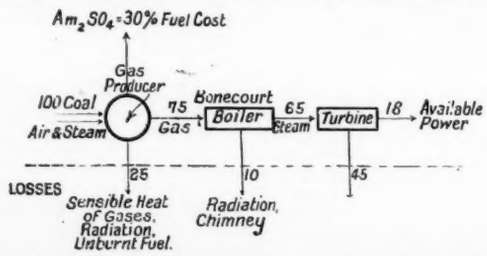
One of the principal losses in connection with steam raising from coal is due to the low efficiencies and evaporative powers of the best types of coal-fired boilers, and, moreover, until recently gas-fired boilers have been so inefficient that their use on a large



scale was out of the question, except where great surpluses of gas were available which would otherwise be wasted. The invention of the method of burning gases flamelessly in contact with incandescent surfaces, however, upon which I had the honour of lecturing here two years ago, has provided a means of achieving both very high efficiencies and evaporative powers with gas-fired multitubular boilers on a large scale. The following table shows the comparative heat balances obtained in actual trials of (1) a large "surface combustion" multitubular boiler fired by coke-oven gas of net calorific value 510 B.Th.U. per cubic foot at N.T.P., and (2) a marine boiler fired with good steam coal of net calorific value 13,800 B.Th.U. per pound (volatile matter 16·1 per cent.).

—		Gas-Fired Surface Combustion Engines.		Coal-Fired Main Boiler.	
Heat utilized		92·7		75·1	
Heat lost	in burnt gases	3·0	7·3	18·1	24·9
	in unburnt gases, &c.	*nil*		2·8	
	by radiation	4·3		4·0	
		100		100	

With the possibility, now within reach, of achieving such high thermal efficiencies in gas-fired boilers, I venture to suggest an alternative scheme, which would combine the advantages of the gas-producer (with its capacity of dealing with low-grade fuel under ammonia recovery conditions), with the high efficiency of the modern steam-turbine, as shown in the next diagram. The



raw coal would, in the first instance, be gasified in a producer under ammonia-recovery conditions; the resulting gas would then be burnt in a surface combustion boiler the efficiency of which with producer gas may be put down at certainly not less than 85 per cent. Finally, steam could be turned into a steam-turbine, of assumed 27 per cent. efficiency, yielding a net result of 17·3 per cent. in respect of power on the available energy of the coal consumed, *plus* 80 lbs. on ammonium sulphate per ton of coal.

So much, then, for the efficiencies of coal to power energy conversion obtainable, either now or in the near future, with the most modern and scientific apparatus and methods. With regard to the rival merits and prospects of the steam-turbine and internal combustion engine, which time and experience alone can finally decide: (1) That from the point of view of the size of units, the turbine has shot far ahead of its rival (the large Parsons turbo-alternator recently installed at Chicago is 35,000 H.P. capacity, far surpassing anything yet attempted with an internal combustion engine unit); (2) that, whereas a gas-engine only works at its highest efficiency with a high load factor, a turbine maintains its efficiency over a wider range of load than its rival, and at low load far surpasses it; (3) that a gas-engine requires much more lubrication, but, on the other hand, usually less cooling water, than the turbine; and (4) that, owing to its simpler construction, the turbine requires less adjustment and repairs, and is more reliable than its rival.

These considerations have led to the almost universal adoption of the steam-turbine for large power stations, except in cases where there are available supplies of surplus gases from coke-ovens, blast-furnaces, or the like. On the other hand, for comparatively small units—say, up to 2000 H.P.—where the load factor is uniformly high and not subject to abrupt variations, the gas-engine has certain advantages. In any case, however, the choice between the two rival systems will not usually be determined on purely thermal considerations, but on other equally important factors.

It is clear, however, that if we are to achieve all the economies in respect of power production which modern engineering has made possible, two things must be brought about by some means or other. Firstly, the owners of existing inefficient plants must, supposing their requirements be large enough to justify their using a separate generating plant, be prepared to put them on the scrap heap without remorse, and, if necessary, the State might advance a portion of the money required to substitute a really efficient plant, on reasonable conditions as to interest and repayment. It is surely not business to continue the use of inefficient plants, where the possible economies to be effected by the substitution of more efficient ones can be shown to be sufficient to yield a good and sure return on the additional capital required; and there can be no better investment of public funds than in the aid of schemes productive of large economies yielding an immediate and assured return in the outlay involved. If the State is prepared to handle the matter in a broad businesslike way, it would be justified in insisting upon large individual users putting their inefficient power-houses in order. Secondly, in order to meet the necessities of the innumerable class of relatively small consumers, the whole question of the organization of public power schemes for the generation and distribution of electrical energy in the most efficient manner, and at the lowest possible cost, should be taken up.

Hitherto, local jealousies as well as vested interests, which our lawyer-ridden Parliament has fostered far too much, have blocked, and are still blocking, the way. How often in the past, in connection with water, gas, and electric light schemes, has Parliament encouraged the formation of small rather than of large and more efficient undertakings—a policy which has proved as disadvantageous to the community at large as it has been profitable to the lawyers who frequent the Parliamentary Bar. A typical example of this sort of thing is afforded by the public electricity supply for Greater London (area = 693 square miles, population = 7½ millions), in which there are, or were recently, no less than 65 separate authorities supplying electricity, upon 49 different systems, from 70 generating stations containing 585 engines, and distributed at 24 different voltages to the consumer, who is charged at one or other of over 70 different rates and prices!

The average size of the generating stations is only 5285 K.W., and of the generating units only 632 K.W. Many of the older stations contain reciprocating engines, and some have even to cart their coal—a truly ridiculous state of affairs. But, notwithstanding these disadvantages, London's demand for current per head of the population has increased five-fold since 1900, and is still expanding. There is probably no area in the world which, in regard to density of population, easy access by sea to abundant fuel, and possibilities in the way of rapidly expanding demands for electricity, both for power and lighting, is more admirably adapted for the development of a public supply of cheap electricity under a single authority, with consequent great economy of fuel and in the cost of production generally. How long will the people of London allow these natural advantages to be nullified by the short-sighted policy which has prevailed hitherto?

North-East Coast Power Scheme.

Given suitable conditions, there are great advantages to be gained in the way of cheap power production by the co-operation of consumers with a properly-organized electric power company operating over a large industrial area; and probably no other European country is so well adapted as our own for such co-operative schemes, because of the compactness of our great industrial areas, the densities of their population, and their prox-

imity to the coalfields. In every industrial area there are factories normally working during the day only; others must of necessity work both day and night without ceasing. In some cases, the power requirements are fairly uniform throughout the day's run; while in others the requirements are subject to large and abrupt variations.

Some establishments—for instance, steel rolling mills—have intermittent loads for short periods far in excess of their average hourly requirements; others, again—for instance, bye-product coke-ovens or blast-furnaces—have large surpluses of gas which cannot be fully utilized on the plant itself. Other factories, also, may have surplus energy to dispose of in the form of so-called "waste heat" or of unutilized "exhaust steam." In every large industrial area there are enormous energy losses continuously going on in different ways, which the individual manufacturer is either unable to utilize effectually himself or about which he is indifferent.

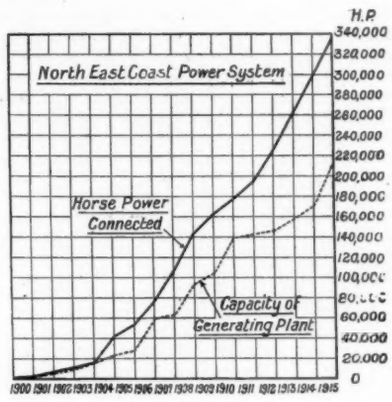
Suppose that the manufacturers in such an area, instead of maintaining a large number of independent, and probably inefficient, power stations of comparatively small sizes, were to co-operate in a well-organized electrical power scheme, whereby all the separate factories, with their variable demands, are linked-up with a few large and efficient power stations, suitably situated in regard to coal supplies, and equipped with the latest generating machinery in considerable units. And, suppose, further, that the organizing company are prepared not only to sell electrical energy, but also to purchase surplus gas, waste heat, and exhaust steam from any of its customers, and convert the same into electrical energy, it is fairly obvious that, in such circumstances, greater economies could be achieved by reasonable co-operation than would be possible under any purely individualistic scheme.

A splendid example of what may be achieved in this way is afforded by the North-East Coast power scheme, which has been so wonderfully developed during the past fifteen years throughout the area covered by the great Northern coal and iron fields, which extend from Morpeth and Blyth in the North to the Cleveland District in the South; and it may perhaps interest you to hear something of its history. The area in question is a remarkable one in many respects. With a population of about 2½ millions (or, say, 5 per cent. of that of the whole country) it produced in 1908 no less than 20 per cent. of the total coal, 36·4 per cent. of the total coke, and 37·5 per cent. of the total iron, raised or made in the kingdom. Owing to its three deep estuaries of the Tyne, the Wear, and the Tees, it built in that year no less than 36·5 per cent. of our total output of shipping tonnage.

It is the district which gave birth to the first public railway in 1825, and in which, two years later (1827), John Walker, of Stockton-on-Tees, invented the first lucifer match. Later on, after the discovery of the Cleveland ironstone beds, it led the world in the development of that mighty engine of production, the modern blast-furnace for iron smelting, and brought to fruition the basic steel process. It was there that Joseph Swan invented the incandescent electric lamp, and that Sir Charles Parsons has developed the steam-turbine. It has built and armed many of our biggest and swiftest battleships and cruisers; and in the "Mauretania" it produced the world's fastest liner, which broke all Atlantic records, and hopelessly outclassed the best that the Germans could build. In its recently developed power scheme, it has achieved the most original and extensive development, on a commercial scale, of electric power for industrial purposes. The result has been a great saving of coal and a reduction of smoke throughout the district, due in part to the concentration of power production and the abolition of inefficient generating plants, and in part also to the utilization of surplus gases, waste heat, and steam, which were formerly wasted.

The present scheme owed its inception to an amalgamation or association of three power companies—namely, the Newcastle Company, which started in 1889 as a small lighting company; the Durham Company, which started in 1901 with three generating stations at Jarrow, Gateshead, and Durham; and the Cleveland Company, which started in 1903, with its principal generating station at Grangetown, near Middlesbrough. In addition to these three Companies, the scheme has absorbed the Durham Collieries Electric Power Company and the Northern Counties Electrical Supply Company. There are now seventeen generating stations—namely, five coal-fired (total capacity, 11,600 H.P.), six waste-heat stations (total capacity, 18,600 H.P.), one partly coal-fired and partly gas-fired (capacity, 45,000 H.P.), two partly coal-fired and partly waste heat (total capacity, 18,500 H.P.), and three partly waste heat and partly gas-fired (total capacity, 17,600 H.P.). The total capacity of the generating plant installed up to the end of last year was 211,800 H.P. The gases utilized are either coke-oven gas or blast-furnace gas, of which there are enormous surpluses in the area. The waste heat stations utilize either the sensible heat in the burnt gases from coke-ovens or the exhaust steam from blowing engines in ironworks, which, before being delivered to the steam-engine, is sometimes "superheated" by the combustion of blast-furnace gas. All the prime movers are steam-turbines; no gas-engine being used. When gas is employed as a source of energy, it is always burnt under boilers, generating steam for turbines.

The next diagram illustrates the phenomenal development of the scheme during the fifteen years (1900-1915) since its inception. The total horse power connected is now nearly 340,000; while the total capacity of the generating plant is nearly 220,000 H.P. The system supplies electricity in bulk to towns and



urban districts at prices considerably less than it would cost any local authority to generate it. The North Eastern Railway Company have electrified some forty miles of the Newcastle suburban railways, and, in addition, drive by electricity from the Power Company's mains their locomotive works at Gateshead, their waggon shops at Shildon (790 H.P.), the repair shops at Walker Gate, Tyne Dock, and Percy Main, as well as the goods stations at Newcastle, and their docks at Middlesbrough (800 H.P.) and Hartlepool (540 H.P.). The Railway Company also are very large customers for current for lighting purposes. Many tramway companies in the area are also large customers. Most of the large industrial establishments—including collieries, ironstone mines, iron and steel works, shipbuilding yards, engineering shops, cement works, soap and alkali works, flour mills, and electro chemical factories—are connected with the system. In short, the scheme is not only a triumph of engineering skill, commercial enterprise, and scientific organization, which probably cannot be matched in any other area in the world, but also is a standing proof that the British manufacturer, who is so often derided by learned professors in London who know him not, is still capable of leading the world in the matter of power organization.

Public Supplies of Gas for Industrial Purposes.

Having given such prominence to the question of public supplies of cheap electrical energy generated from coal, I must not overlook the important subject of the organization of cheap supplies of gas for manufacturing purposes, which is playing a great part in the promotion of more scientific means of applying and controlling industrial operations. The larger users of gaseous fuel will doubtless continue to find it cheaper and better to generate producer gas by the complete gasification of coal and coke on their own premises than to purchase gas from any public company. But there remain a very large number of industrial consumers whose individual needs for gas are not large enough to warrant the installation of separate gasification plant, but whose requirements constitute, in the aggregate, a very large and important demand, which can only be met economically by a public supply company.

Some of the large towns gas-works, situated in industrial areas, are taking up the matter with great energy and success. Thus the Birmingham Corporation has installed a splendid system of high-pressure gas distribution throughout its industrial area, and before the war was supplying manufacturers with coal gas at a pressure of 12 lbs. per square inch, at a net price varying between 11·4d. and 15·2d. per 1000 cubic feet. During the year ending March 31, 1913, no less than 1,900,000,000 cubic feet of gas (or 22½ per cent. of the city's total output) were sold in the Birmingham area for industrial purposes. It is largely used for aluminium and brass and lead melting in crucible furnaces, for the hardening, tempering, and annealing of metals, for the annealing of glass, and the like.

The Sheffield United Gas Company have been no less enterprising. In 1913, the smallest consumer in Sheffield paid no more than 15d. per 1000 cubic feet for his gas, and consumers using more than 500,000 cubic feet per annum were charged 12d. per 1000 cubic feet for all gas between the first 500,000 cubic feet and 6,000,000 cubic feet per annum, and only 10d. per 1000 cubic feet for anything in excess of the last-named quantity. This enlightened policy has led to a considerable use of coal gas in some of the Sheffield steel-works, chiefly for the hardening, tempering, and annealing of special steels (including tool steels), and for file forging—all of them operations in which accurate temperature control is a matter of vital importance. One works alone was using 18,000,000 cubic feet per annum in connection with the manufacture of agricultural implements. In this connection, I must mention the enterprise of the South Staffordshire Mond Gas Company, who, from the central generating station at Dudley Port, near Tipton (South Staffordshire), were recently distributing Mond gas of a net calorific value of 140 B.Th.U. per cubic foot at N.T.P. in mains over an industrial area of 123 square miles, and selling it to consumers at 1¾d. per 1000 cubic feet, which is equivalent to town gas at 7d. per 1000 cubic feet—a figure that promises well for the future of such schemes in areas of similar industrial concentration.

Fuel Economy in the Iron and Steel Industries.

The history of research and invention in relation to fuel economy in the iron and steel industries since James Neilson, the Manager of the Glasgow Gas-Works, introduced in 1829 his revolutionary idea of using hot blast in the smelting of iron, is veritably a romance to be handed down to posterity as perhaps the finest record of British creative achievement in the domain of applied science during the Nineteenth Century. Unfortunately, the few minutes that remain will not allow of my giving you more than a glimpse of its concluding chapter, which relates more particularly to the utilization of blast-furnace and coke-oven gases in the manufacture of steel. Although it is a chapter to which British, Belgian, and German chemists and engineers have equally contributed during the past twenty years, I should like to mention especially the name of the late Adolphe Greiner, the distinguished head of the Cockerill Works at Seraing, near Liège, to whose enterprise the world principally owes the development of the large gas-engine for dealing with blast-furnace gas, and whose recent death, after a year's bitter experience of German invasion, all British metallurgists deplore.

The British iron and steel industry still labours under the disadvantage compared with its German rival on account of its much earlier development. We built most of our blast-furnaces and rolling mills during the iron age, when it mattered little whether or not the smelting of iron was carried out on the same site as the subsequent manufacture of rails and plates. The modern German industry, on the other hand, took its rise after the invention of the basic steel process, when the great advantages of close proximity of blast-furnaces, steel works, and rolling mills were so manifest that all subsequent installations of plant were expressly planned and laid out so far as to secure them. Consequently, whereas all the great German works erected during the past thirty years have, from the outset, embodied and profited by these advantages, many of the older British plants have had to be gradually remodelled, as circumstances permitted, so as to conform, as far as possible, to the new conditions. Such a process necessarily takes time, and there are still some of our works that have not yet completed the change.

In times past, therefore, when the furnace plant was isolated from the coke-ovens on the one hand, and from the steel-works and rolling mills on the other, coke was manufactured at the pit head in the old beehive ovens and then railed to the blast-furnaces. The pig iron made in the blast-furnaces was then sent (often cold) to the steel-works, where it was converted into steel, and the latter subsequently rolled into girders, plates, rails, &c.—operations necessitating an additional expenditure of fuel. For this purpose raw coal was gasified in producers at the steel-works, and a further quantity of it was also burned under boilers to provide steam power for the rolling mills. For every ton of iron produced at the blast-furnace, 1·6 tons of raw coal had to be coked at the colliery, and an additional 0·75 ton at least had to be sent to the steel-works and rolling mills, entailing in all an expenditure of not less (and often more) than 2·35 tons of raw coal per ton of finished steel sections produced.

Now, the natural laws and conditions governing the reduction of the iron ore in blast-furnaces, which were formerly not so well understood as now, are such as to make it impossible to utilize in the furnace itself more than about one-third of the energy of the coke charged into it *plus* the energy of the hot blast. The remaining two-thirds leaves the furnace partly as heat in the molten iron and slag, but mainly as combustible gas.

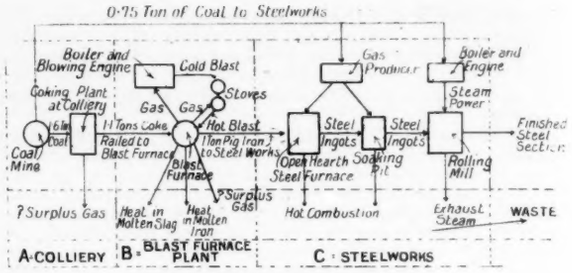
Heat-Balance of a Blast-Furnace.

Heat of combustion of coke.	= 90	Heat utilized in furnace . .	= 30
Sensible heat of blast . .	= 10	Heat of combustion of gas .	= 45
		Heat in molten slag and iron	= 15
		Radiation or other losses .	= 10
	100		100

Thus, for every ton of iron produced, some 168,000 cubic feet of gas, containing from 28 to 30 per cent. of carbon monoxide and about 1 per cent. of hydrogen, leave the furnace, the potential energy of which is about 45 per cent. of that of the coke charged into the furnace.

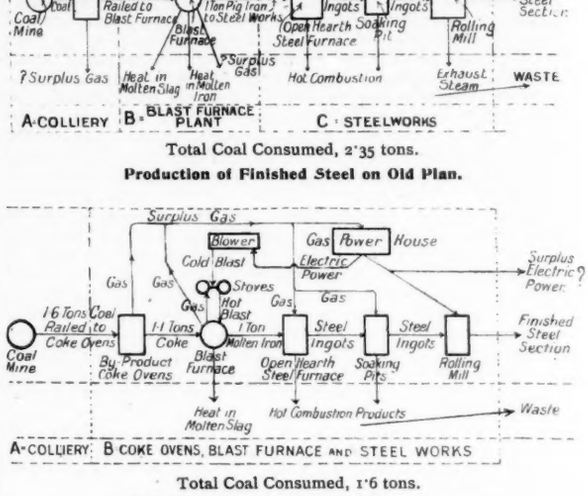
About 60 per cent. of this gas could be utilized for generating and heating the blast; but the balance of 40 per cent. was a surplus for which no further use could be found, unless the plant either adjoined, and was worked in conjunction with, the steel-works, which was not always or often the case, or (as was only possible within recent years) some independent power company was at hand to purchase it. Hence the blast-furnace manager had no particular interest in the gas beyond the portion of it which could be utilized on his plant, and it mattered little to him how much was lost by leakages, or how inefficiently it was burnt under his boilers; for he always had more than enough of it.

The rapid development during the past fifteen years of the large gas-engine in relation to blast-furnace gas, which we owe chiefly to the pioneering labours of Belgian engineers during the years 1896 to 1900, and later also to German enterprise, has entirely changed the whole complexion of the case, and inaugurated a new era in fuel economy of which we, in this country at any rate, are only beginning to reap the benefit. It has been my privilege during recent years to see these new possibilities demonstrated in the Skinningrove Iron and Steel Works, which have been remodelled and extended under the direction of my relative Mr. T. C. Hutchinson, who has brought to bear upon the task a life's experience in the pursuit of fuel economy in this branch of industry. Without troubling you with unnecessary technical details, I will now indicate the nature and significance of these reforms, which are on the point of being realized.



Total Coal Consumed, 2·35 tons.

Production of Finished Steel on Old Plan.



Total Coal Consumed, 1·6 tons.

Production of Finished Steel on New Plan.

The cardinal feature of this new development is the concentration of bye-product coke-ovens, blast-furnaces, steel-works, and rolling mills in one plant, coupled with the utilization of the combined surpluses of coke-oven gas and cleaned blast-furnace gas, partly in large gas-engines driving dynamos generating electrical energy for driving the rolling mills and all other machinery on the plant, and partly also to displace producer gas as the fuel for the steel-furnaces and soaking pits. In this way it has been proved possible to take in ironstone at one end of the works and turn out finished steel sections at the other, using no more coal than must be charged into the coke-ovens to make the necessary amount of coke for the blast furnaces.

Translated into figures, this means that, whereas formerly, under the old plan, it was necessary to consume altogether not less than 2·35 tons of coal per ton of iron converted into finished steel sections, it is now possible, under the new arrangements, to effect the same ultimate result with an expenditure of no more than 1·6 tons of coal, or, in other words, to effect a net saving of 0·75 ton of coal per ton of iron produced. If this were universally achieved, it would involve a saving equivalent to about one-third of the 30,000,000 tons of coal annually consumed in British iron and steel works at the outbreak of the war. But even the universal achievement of these new reforms will not exhaust all the possible economies in the production of iron and steel. There will still remain to be dealt with at least one prominent item of present loss—namely, the heat contained in the molten slag running from the blast-furnaces. This is probably equivalent to between 8 and 12 per cent. of the calorific value of the coke charged into the furnaces, according to the richness and character of the ore smelted. The problem of turning this to good account is beset with technical difficulties; but already a beginning has been made in at least one British establishment to deal with all details, and success will be eventually achieved.

At the outset of my first lecture, I ventured to express the opinion that "with an efficient and systematic public supervision and control of fuel consumptions, we ought to be able, even with existing appliances, to save many millions of our annual coal bill, and, with improved methods and organization, still more millions." I have endeavoured to fully explain the grounds on which this opinion is based, and to indicate the chief directions in which such huge economies may be achieved. I have not consciously exaggerated either the magnitude of possible saving or the gravity and urgency of the case from a national point of view.

The last Royal Commission on Coal Supplies reported, in 1905, after an exhaustive inquiry, that, on the basis of Mr. Beilby's estimate, the possible saving in our then annual coal consumption amounted to between 40,000,000 and 60,000,000 tons; and, if my rough estimate is anywhere near the mark, the margin is probably not much less to-day. Truly in matters of national saving we "strain at gnats and swallow camels." There is no excuse for the inaction of our rulers during the past ten years, because the report of the Royal Commission was "presented to both Houses of Parliament by Command of His Majesty." Those were the piping days of peace and plenty, when we thought but little of the morrow; but now that war has brought us face to face with the stern realities of the case, let it not be said to our shame by posterity that we knew our duty in the matter and did it not.

OUR BRITISH PATENT LAWS

AND THEIR BEARING ON FUTURE GERMAN TRADE.

By James Keith, Assoc.M.Inst.C.E., M.I.Mech.E., &c.

During the past twenty-five years or thereby some of us have done our best, in season and out of season, by pamphlet, brochure, in Parliament, and by communications to the Press, to impress our legislators with the importance of putting our British patent system on a better footing for the benefit of British inventors and for the general progressive business of the Empire.

Notwithstanding frequent revision of the patent law, we have only yet attained to an elementary form of qualified search, and have not yet succeeded in throwing off the burden of patent taxes, which still remain to the injury and discouragement of British invention and British trade.

The first revolution in our patent system was in 1883, when the late Right Honourable Joseph Chamberlain, M.P. (a "business" man), while President of the Board of Trade, framed and carried the "Patents, Designs, and Trade Marks Act, 1883," which, although an immense improvement on the old Act of 1852, had many serious faults, such as the continuation of the heavy renewal fees, though payable in a different way, too short a period for the duration of the patent, and failure to provide any form of search, with the consequent absence of any certainty of protection to the inventor.

Passing over the Amending Acts of 1884, 1886, 1888, 1901, and 1902, of minor importance, a second revolution was effected or promised by the much-belauded Patent Act of 1907, formulated and carried by the Right Honourable D. Lloyd George, M.P. (a "lawyer"), President of the Board of Trade, the success of which is still to seek.

If the Act of 1883 was revolutionary in one sense, the Lloyd George Act of 1907 was even more revolutionary in quite another and more harmful sense. And undoubtedly it is to the practical ignorance displayed in the framing of the Act of 1907, and its ridiculous provisions, that most of our present grievances (and especially as regards Germans) have arisen.

Hitherto, all previous British Patent Acts except that of 1907 had the redeeming quality of catholicity in their not insisting on the working in this country of a British patent granted to a foreigner; and in this broad-minded and non-parochial sense they corresponded with the patent system in vogue in the United States, which system has proved so successful in comparison with the systems of all other countries. Why Mr. Lloyd George should have followed the lead of an autocratic country like Germany in this sense, instead of that of a progressive nationality like the United States, has always been somewhat of a mystery—more especially seeing that the very precautions he apparently took to keep down German competition actually were the means of bringing, if not inviting, numbers of Germans over to Great Britain, ostensibly for the working of British patents granted to Germans, but practically to act as spies, as since the war we have discovered to our cost.

Arising out of these provisions in the Act of 1907 (as quite natural to Germans), the Germans quickly adopted reprisals against British owners of patents in Germany—bringing into force additional provisions for compulsory working in Germany, and at the same time making it actually almost futile for British inventors to seek patents in Germany; while Americans applying for patents in Germany obtained special privileges, because of the freedom from obligation to work patents granted in America to foreign owners of United States patents.

The Act of 1907, with the Act of 1914 and rules made thereunder—after the war had begun—are responsible for the following present grievances:

1.—The Comptroller of the British Patent Office has not apparently the power to refuse acceptance of any application for a British patent, even although a patent for the identical invention may have been granted and published years before in a foreign country.

Any British inventor prejudiced by the issue of the patent must simply accept the situation; his only recourse being to institute proceedings in Court after the invalid British patent has been sealed.

Note.—The International Convention allows only a term of twelve months for filing a British application for an invention patented abroad; and no British inventor under the same convention rules has more than twelve months in which to file a foreign application for his invention patented in this country.

2.—Any German desiring to appropriate a British invention for which a British patent has been granted to a British inventor may do so in the following circumstances:

Supposing the British inventor applies within twelve months for a patent in Germany for his invention, his application may be successfully opposed there on one ground or another, and a decision issued in circumstances such that the British applicant cannot secure a hearing.

In the case of an opposition to a British application of a German subject, proceedings are postponed to the end of the war.

Note.—These privileges to foreigners are absolutely one-sided, so far as the ending of the war goes, though the foreigner's accepted British application cannot be sealed till the end of the war.

3.—Under the 1907 Patent Act, anything known or unknown for which a patent is applied in this country, however impracticable (for which a British patent specification has not been filed in the British Patent Office Library during fifty years before the date of application), is entitled to British patent protection—51 years' anticipation does not count.

Note.—These cases are not in any way hypothetical, but are taken from examples at the present time in actual existence.

After the passing of the 1883 Act of Parliament, there were great expectations that the result would be an increase in the number of "Applications for Patents." These expectations were fully justified, as in 1884, when the new Act came into force, the number of applications had increased by nearly three times the number in the previous year; while by 1889, or after six years, the patent applications had increased by nearly four times, and by 1897 the number had reached something like 31,000, or over 500 per cent. more than the applications in 1883 under the old Act. This number has practically been the high-water mark ever since. Certainly the 1907 Act, so much boomed by its author and the Press at the time of its introduction, has most lamentably failed to increase progressively, as expected, the number of applications for letters patent.

It is satisfactory to note that in the "Death Knell of German Trade" debate, which took place in the House of Commons on January 10, Mr. Runciman (the President of the Board of Trade, who controls the British Patent Office) pledged himself in the following words:

> I also agree that we must overhaul once more our patent system and our copyright laws.

This, however, is only a paraphrase of what his predecessor at the Board of Trade (the Right Honourable Mr. Ritchie, M.P.), stated before the Associated Chambers of Commerce in 1900—nearly 16 years ago. So it may still be necessary to keep our new President of the Board of Trade this time strictly to his pledge.

In the same great speech, Mr. Runciman further said:

> During the war we should do everything to destroy German credit; and to that end we should do everything in our power to cripple, cramp, squeeze, and destroy her trade.
>
> We must see to it that, having ended this war victoriously, we do not give Germany a chance of reconstructing her commercial position. One of the first necessities of this country, if she is to hold her own during times of war, and when war is over, is that we must improve our research methods.

These are brave and strong words to come from the President of the Board of Trade; but, to show earnestness, the first thing to be done should be the immediate scrapping of all rules so generously arranged by our Government for the benefit of the Germans since the war started.

Invention, which is the life and soul of progress to any nation, should be welcomed and encouraged, as unfortunately it is not under our present patent procedure; and, in the "overhauling" again of our patent system (foreshadowed by Mr. Runciman) there should, among other things, be included:

1.—A real search to ensure novelty and validity, before any application for a patent be entertained.
2.—No patent to be granted unless novel or practicable.
3.—The entire abolition of all renewal fees. } Both as in
4.—The extension of the period for each patent from fourteen to seventeen years. } the United States.
5.—Some form of a guarantee for a *bonâ-fide* inventor.
6.—Simplified Court procedure in patent cases, so as to limit the frightful expense of patent litigation.

Note.—In the formulation of any new Patent Act, inventors, engineers, and business men should be called into consultation more than Patent-Counsel, Lawyers, and Patent Agents, as has hitherto been the case.

Then, with the indispensable "Minister of Commerce or Industry," so long rightly clamoured for by the Chambers of Commerce and other representative bodies throughout the United Kingdom, and these moderate advantages enumerated, Great Britain, after the war, would be brought into something like line with the United States—its principal future competitor in the world's trade—and so have every chance of holding its own.

The policy of Germany at the present time appears to be to uphold at any cost its present trade and its future outside commerce in this and in every other country.

The world now knows how the Germans look upon agreements, what double-dyed pirates they have proved themselves to be at sea, and some of us at least know they are equally piratical or "Hunnish" in their business transactions on land everywhere.

So far therefore as Germany and Austria are concerned, "laissez faire" policy must go by the board, and Teutonic trade and business of all kind must be absolutely "barred" for, at any rate, all our time.

NATIONAL ILLUMINATION COMMITTEE OF GREAT BRITAIN.

Report of the Chairman.

At the Special Annual Meeting of the Committee of the National Illumination Committee of Great Britain, held on the 27th ult., the Chairman (Mr. William Duddell) presented his report, in the course of which he said that the year 1915 was somewhat uneventful in the life of the Committee, as a great part of the international work which was contemplated had to be wholly suspended. The Committee sustained the loss by death in July of its Chairman, Mr. Edward Allen, of Liverpool. The Committee chose him (Mr. Duddell) to be Chairman, and Mr. John Bond as one of the Vice-Chairmen. During the year the Committee met twice. At the first meeting Mr. Trotter's proposal was adopted, that the Committee should invite the National Physical Laboratory and teaching institutions to determine the height of the amyl-acetate flame which affords the light of one standard candle.

This appeal resulted in reports from Dr. Houstoun, Professor Mather, Professor Marchant, and Professor Morris; while Mr. Trotter made a comparison of the results obtained and which results are now under consideration by the Committee and the experimenters. A paper by Dr. Ott, of Zurich, on the "Effect of Variations in Atmospheric Conditions on the Light of the Hefner Lamp," was received, and, with Dr. Ott's consent, it was published in the Technical Press. [It appeared in the "JOURNAL" for Nov. 16 last, p. 378.] It seems improbable, the report concluded, that international co-operation will be obtainable to any reasonable extent during the present year; and the National Committee will, Mr. Duddell thinks, continue its work on the subjects that are already before it.

SOCIETY OF ENGINEERS.

Presidential Address of Mr. Percy Griffith.

At last evening's meeting of the Society of Engineers, which was held at Caxton Hall, Westminster, Mr. PERCY GRIFFITH, M.Inst.C.E., delivered his Inaugural Address, on taking, for the second time, the office of President—the previous occasion being fourteen years ago.

He first dealt with the status of the engineering profession; urging that it is necessary to educate the public as to the functions, qualifications, rules of conduct, and basis for remuneration of the various classes of engineers; and, secondly, that this education of the public, as well as the settlement of questions affecting engineers in their relationship one to another, calls for the establishment of a new organization constituted on somewhat different lines from the various institutions at present existing, the chief purpose of which is the discussion of technical problems arising in the exercise of professional duties.

The portions of the address dealing specifically with gas supply and water supply were in the following terms.

GAS SUPPLY.

Reference to the subjects mentioned in my previous address will afford striking evidence of the progress made in this branch of engineering during the past fourteen years. What was then described as a "fair prospect" of "seeing the flat-flame burner displaced by the incandescent burner," is now, for all practical purposes, an accomplished fact. The then vague possibility of heating power being substituted for illuminating power as a criterion of statutory test is also now normal practice, though the cost of manufacture under modern conditions has not been reduced to the extent which at that time seemed probable. Nevertheless, a marked increase has been obtained in the yield of gas per ton of coal; the then normal average of 10,000 cubic feet per ton having advanced to a figure approaching 13,000 cubic feet per ton, without, of course, including water gas.

The supervision of consumers' fittings, which in 1902 was something of a novelty, is now universally undertaken, generally at charges which barely cover the actual cost; and the hiring-out of stoves, fires, and fittings, combined with the use of slot or prepayment meters, described then as a "recent practice," is now developed until the amount of capital employed in this way forms a very appreciable proportion of the whole capital employed, and the proportion of slot consumers has risen from an average of 25 per cent. to an average of 50 per cent. High-pressure lighting for streets, shop-fronts, and large open or covered spaces has steadily developed; maintaining, if not improving, its position relative to electric light. While the Scott-Snell automatic high-pressure lamp, which in 1902 seemed to have a brilliant prospect of success, has failed to stand the test of time, the inverted gas-burner, then a novelty, is now in common use, and has more than fulfilled the expectations of its progenitors.

The most conspicuous developments in connection with carbonizing plant are vertical retort-settings (both continuous and intermittent), and the extended use of machinery for handling coal and coke, particularly machines for charging and drawing horizontal retorts. In regard to administration, the delivery of gas through high-pressure trunk mains, enabling it to be conveyed long distances in mains of relatively small diameter, has tended to develop the centralization of carbonizing works, and the amalgamation of adjacent undertakings; and further development in this direction appears likely in the future.

The war has opened a very brilliant future for the important bye-product tar, which has secured an immediate market as a source of the high explosives used in munitions, and has also, owing to the temporary cutting-off of the supply of chemicals and dyes from Germany, and the scientific development of this industry in Great Britain which will, it is hoped, follow, obtained a still brighter prospect for the future. The application of gas to manufacturing processes requiring a readily-controlled source of heat has also made rapid strides; and in every respect the future prospects of this important industry are such as the energy, ingenuity, and resourcefulness of English gas engineers have amply merited.

WATER SUPPLY.

On turning to that branch of the profession with which I have been most intimately associated, it is perhaps not without interest to recall the remarks contained in my Presidential Address of 1902, if only for the purpose of observing the progress made in the intervening years. This is the more easy because in a Blue-Book recently issued by the Local Government Board the present position in regard to some of the more general features of the water supply of this country, to which I specially referred in 1902, will be found to be clearly stated. From the preliminary memorandum preceding the statistical information contained in this, it will be seen that there has been no general water supply legislation during this interval, though the Blue-Book itself may be considered as a preliminary step in this direction. It is a matter for regret that the Legislature should exhibit such palpable reluctance to deal with problems of a domestic character, and yet devote so much energy to political problems which are, in many cases, of much less importance to the well-being of the community at large.

Take, for example, the question of responsibilty for providing a public supply of water. As far back as 1878, the Select Committee on the Public Health (Water) Act of that year made several recommendations calculated to facilitate the action of local sanitary authorities in securing or providing supplies of water for their districts; but for the most part similar recommendations are repeated in the Blue-Book above referred to—thus showing that defects admitted in 1878 remain uncorrected in 1915. Similarly in the case of areas of supply, and the difficulties of combining sanitary districts for water supply purposes, the present condition of affairs is practically the same as in 1902, except for a few isolated cases where Joint Water Boards have been created for large and populous areas. As Mr. Henry C. Adams (Vice-President) has pointed out in his Presidential Address to the Institution of Municipal Engineers, there is urgent need of legislation to facilitate, and under certain circumstances to compel, the union of adjacent rural parishes for schemes of water supply.

In connection with the allocation of sources of supply and the need for a permanent central authority to deal with this matter on certain well-defined principles, in contradistinction to the present method of settling such questions in Select Committees of the Houses of Parliament, the position has remained unaltered, in spite of many reiterated recommendations of Royal Commissions, Government Departments, and Parliamentary Committees, to say nothing of influential public bodies such as the County Councils Association, the Institution of Water Engineers, &c. In regard to municipalization, some progress has been made by private legislation transferring particular undertakings to the local authorities of the district; but no general legislation has been promoted to transfer to local authorities areas which, although included in the statutory limits of company undertakings, are not supplied with water on account of the available revenue in water-rates being less than the amount prescribed in the Water-Works Clauses Act, 1847, nor to permit local authorities to make up the prescribed revenue out of the general rate.

On all such general questions, the position has not changed since I last occupied this chair; and it must, I think, be admitted that, in matters of this kind, our national tendency to wait for a serious emergency before remedying known defects, has proved a great disadvantage. At the present moment, however, it may be confidently hoped that, after the rude awakening which the nation has experienced in connection with its most vital interests, the policy of *laissez-faire* will be entirely abandoned, and when relieved from the strain imposed by the war, the nation (and particularly the Legislature) will make a point of dealing promptly with all domestic questions in connection with which defects are discovered or improvements are called for.

In regard to water-works, there is at the moment little progress to record, as expenditure on public works of this nature has been ruthlessly curtailed on account of the war. Nevertheless, I feel bound, not only in the interests of my *confrères*, but also in the public interest, to suggest that water and sanitary authorities should not allow this period of "suspended animation" to be wasted. There are many cases in which urgent works will have to be undertaken or resumed immediately the war is over; and the relatively small amount of expenditure involved in the preparation of plans and specifications might with advantage be incurred at once. Where the local water authorities do not take the initiative in this direction, it may reasonably be urged that the Local Government Board should use their influence to press forward the preliminary work in question. I would even suggest

that in most cases engineers would be glad to do the work now rather than later on, if only to occupy such of their assistants as are beyond the military age, and that the payment of fees could be deferred until the war is over.

In connection with works of water supply, recent practice has exhibited little in the way of novelty. Public attention is, of course, attracted mainly by the larger works, particularly those involving the construction of impounding reservoirs. But, meanwhile, the most intricate and interesting problems are constantly being solved under circumstances which are not favourable to publicity; and the engineer engaged on smaller works has the satisfaction of gaining experience in many complex details of water-works practice which escape the notice of those absorbed in designing larger and more costly schemes. I therefore desire to urge upon such of my *confrères* as practise in small works to make a point of publishing their experiences in the form of papers, and to realize that, with the exception of the Institution of Water Engineers, this Society is the most appropriate means of securing their publication and discussion.

While but little novelty is to be found in works of water supply generally, a great deal of useful and unobtrusive research has been carried on in connection with the filtration of supplies derived from sources liable to pollution. The increasing use of mechanical filters may be taken as the practical issue of this research; but it must not be assumed that this practice alone affords a solution of the problems involved. The experiments carried out by Dr. Houston for the Metropolitan Water Board have proved the enormous and unexpected effects of simple storage, and have also demonstrated the efficiency of treatment with an excess of lime followed by sedimentation and efficient filtration, thus involving a softening of the water at the same time. Intelligent combination of old and new methods is also well illustrated by the successful application of mechanical filters in conjunction with slow sand filters, and also by the Puech system, in which the filter-beds are arranged in sequence, commencing with those where gravel is used as the filtering medium, and ending with those where fine sand is employed.

While dealing with the question of filtration, it may be worth while to consider the broader question of the conditions necessary to warrant a water being regarded as suitable for ordinary domestic use, or, in other words, as "a pure and wholesome water," as defined in the Water-Works Clauses Act, 1847. In a paper presented to the Institution of Water Engineers in June, 1914, Professor S. Delépine, of the Manchester University, describing the standard results to be required of any modern filtration plant, suggested some tests for filter effluents which may be accepted as a safe and practical definition of what "a pure and wholesome water" should be. I therefore venture to reproduce these tests as being applicable—with some obvious exceptions—to all water supplies whether they are artificially filtered or not. [See "JOURNAL," Vol. CXXVII., p. 108.]

AMERICAN ILLUMINATING ENGINEERING SOCIETY.

Mid-Winter Convention.

This Meeting is being held during the present week in the Engineering Societies Building, New York. The feature of the Convention is expected to be the attendance of Mr. Thomas Alva Edison, who will be asked, at a banquet that is to be tendered to him on Thursday evening, to accept honorary membership of the Society.

In issuing the programme of proceedings, the Chairman of the Convention Committee (Mr. Arthur Williams) says that the list of papers to be presented showed a wide range of subjects. There was to be a review and record of what has been accomplished in the art and science of illuminating engineering, and it was hoped the discussion would "bring forth plans for the future advance of the art"—the Society expecting "a year of greater activity than ever before in all the fields that have been covered."

On Friday afternoon a popular lecture is to be given by Mr. W. D'Arcy Ryan, the designer of the lighting of the Panama Pacific Exposition. This will be illustrated by coloured transparencies, 24 feet by 36 feet, which it is said will convey more fully to those who did not visit the exposition the wonderful lighting effects produced with colour.

Among the papers mentioned in the programme are the following: "Relation of Lighting to Architectural Interiors," by Professor Morgan Brooks. "Theatre Lighting," by Mr. Bassett Jones. "Illuminating Engineering Photographs," by Mr. B. H. Norris. "Lighting of the General Offices of the Consolidated Gas and the New York Edison Companies, Consolidated Gas Building, New York City," by Messrs. Thomas Scofield and Clarence L. Law. "Gas Lighting of a Large Cathedral in Philadelphia," by Mr. J. D. Lee. "An 'Average Eye' for Heterochromatic Photometry, and a Comparison of a Flicker and an Equality-of-Brightness Photometer," by Messrs. E. C. Crittenden and F. K. Richtmyer. "An Integrating Sphere," by Messrs. E. B. Rosa and A. H. Taylor. "The Box Photometer," by Professor L. O. Grondahl.

LONDON AND SOUTHERN JUNIOR ASSOCIATION.

Visit to the Wandsworth Gas-Works.

About forty members of the London and Southern District Junior Gas Association spent a busy afternoon on Saturday at the Wandsworth works of the Wandsworth, Wimbledon, and Epsom District Gas Company. In the unavoidable absence of Mr. H. O. Carr, the Company's Chief Engineer, the visitors were welcomed by Mr. C. M. Croft, the Assistant-Engineer, who, with Mr. S. J. Oxer (Chief Draughtsman) and Mr. G. Gardiner, took the various parties over the works. It may be remarked that this is the second occasion on which the Company have extended their hospitality to the Junior Association; the previous visit having taken place in October, 1907. In June, 1913, also, when Mr. Carr was President, the Southern District Association of Gas Engineers and Managers went over the works, particulars of which, in connection with both events, were given in the "JOURNAL" at the time. Since the full description which was published in the number for May 27, 1913, p. 586., there have been some additions and alterations; but in the main, of course, the works are as they then were.

One of the features on which the visitors last Saturday agreed that the Company are to be congratulated is the large amount of ground available. Another is the favourable situation of the land. As a matter of fact, out of some 23 acres, only about 11 acres are at present occupied, leaving over one-half of the site available for further extensions. The manufacturing capacity is nearly 9 million cubic feet per twenty-four hours. The members were first shown the means by which the whole of the coal required by the Company is brought into the works, which have a large frontage on the River Thames, and also a canal leading from it. The coal when it arrives in the Company's own colliers is unloaded into barges, and brought alongside as required, for placing into store; that needed for the Mitcham and Epsom works being subsequently conveyed there by Foden steam-waggons. These steam-waggons are being run entirely on coke, which is found to be very satisfactory, as well, of course, as a highly convenient fuel from the Company's point of view. As to the unloading of the coal from the sea-going steamers, in connection with this attention was drawn to three Belgian barges, of a capacity of 750 tons each, which have been acquired by the Company. These came from Antwerp shortly before the Germans took possession of the city. At the present time the coal-handling arrangements are being extended by the provision of a 100-ton an hour Gibbons bucket conveyor; and there is to be a large hopper for taking the Mitcham and Epsom coal.

There are two retort-houses; but one of them—in which the two benches of eight settings of six retorts are heated by direct fires, having one furnace on each side of the setting—is treated as a stand-by, and is not now in use. The house in which the coal gas is being produced is 377 feet long, and 65 feet wide, containing 35 beds of ten retorts. The settings are of the regenerative type, with single furnaces all arranged on one side of the sets only. De Brouwer and Fiddes-Aldridge stoking machines are to be seen working side by side in this house. Full retorts are worked—15 cwt., and ten-hour charges. A visit was paid to the power-house, where the means for generating electric current for use on the works were seen to be of a very complete character. The scrubbers, which are filled with wood grids, were noticed; and the purifying arrangements were explained. There are nine purifiers, eight of them, 40 ft. by 36 ft. by 8 ft. deep, under one roof. Five tiers of oxide are used; and the flow of gas is broken into three streams.

The sulphate plant, with a capacity of producing about 5 tons of sulphate of ammonia per 24 hours, was not overlooked; neither were the water supply arrangements of the works. Water is derived from both the river and from an artesian well 430 feet deep. That from the river is raised by pumps driven by a gas-engine; while the artesian well water is lifted by means of compressed air. The sulphate plant consists of two stills working on the intermittent system, and connected to a superheater and two Coffey stills. There are two saturators, one of which is fitted with a steam ejector. There is a naphthalene extractor 10 feet square and 30 feet high, fitted with spreaders on top, as in the case of ordinary scrubbers; the base of the extractor being used as a tank. The method of working adopted is the circulation by a pump of carburetted water-gas tar from the tank at the bottom to the spreaders at the top. Speaking of water-gas tar leads to mention of the fact that there are on the works two sets of carburetted water-gas plant, made by Messrs. Humphreys and Glasgow on the Lowe system, which have a combined capacity of 1,800,000 cubic feet of gas per day. The coke is elevated to the stage floor by hydraulic lift. Oil is pumped direct from barges into the storage tanks. There are four station-meters, in a house constructed of "Hy-Rib" material, plastered on both sides. Keith-Blackman boosting plant is capable of raising half-a-million cubic feet of gas per hour 12 inches above the initial pressure of the holders. From the governor-house, there are four 30-inch outlet mains to the district.

A large Head-Wrightson "Notanos" washer, of a capacity of 10 tons an hour, separates the coke and breeze from the clinker. This is arranged at such a height that the Foden steam-waggons can run into what is practically a tunnel under the storage receptacles, with openings in the top, from which they are filled. The

water used in the washer passes down into a settling tank at the bottom, from which it is afterwards pumped up for use over and over again. Another thing which the visitors were able to inspect was a new Hird-Chambers tar dehydrating plant.

The inspection concluded with the workshops—blacksmiths', fitters', carpenters', &c.—and the stove shops. The latter are in a building on the site of the old gas-works, which was originally a retort-house, with a coal-store running the entire length of each side. The retort-house and one of the coal-stores make stove-repairing shops of dimensions which certainly filled some of the visitors with envy. They had explained to them the method adopted of burning-off stoves in two ovens, and the processes of "Bower-Barffing" and re-tinning various stove parts and articles. The coal-store on the other side of this old retort-house has been converted into offices for the inspectors and inspectors' clerks; and at the conclusion of the tour round the works, the different parties joined-up in these offices, where they found tea awaiting. During this portion of the proceedings, Mr. Carr returned to the works, and at once came along to greet the members.

The PRESIDENT (Mr. S. B. Chandler, of the South Suburban Gas Company) remarked that they had had a very instructive visit. At such a time as the present, the Association should be particularly grateful to those companies who were so good as to allow them to go over their works on a Saturday afternoon. They had seen that the Wandsworth Company were very busy, and knew that they were able to sell gas at a cheap rate. They all regretted very much that Mr. Carr had been unable to be present during the early part of the afternoon; but the members knew how much occupied he was. The thanks of the Association were due to the Directors and Mr. Carr. They had not only been permitted to go over the works, but had been received in a very hospitable manner. Their thanks were also specially due to those gentlemen who had conducted them round, and shown them all there was to be seen.

Mr. F. PEARCE (the Senior Vice-President) proposed a hearty vote of thanks to the Directors of the Company, and to Mr. Carr, Mr. Croft, and the other members of the staff who had been with them during the afternoon. The members were, he said, exceedingly grateful for the pleasant and instructive time they had spent. They had seen under every-day conditions the works of a Company supplying a large district with gas under favourable conditions as to price.

Mr. D. C. CROSS, in seconding, expressed the opinion that it had been one of the most enjoyable visits to a gas-works which the Association had taken part in. Some of the ingenious things they had seen gave them an idea as to how it was the Company found themselves in a position to sell gas at so moderate a price.

Mr. CROFT, in acknowledging the cordially passed vote of thanks, said it had been a great pleasure to him to show the members round, as he was sure it would also have been to Mr. Carr had he been able to be with them. One of the Company's steamers had been expected to arrive during the day; and he was rather sorry it had not done so, because they would then have been able to see something of their methods of unloading.

Mr. CARR, on being asked by the President to say a few words, remarked that he was delighted to see the members at the works; and if they wished to come again on a future occasion, the Directors would be quite as pleased for them to do so as they were now—and so would he personally be. It was always a pleasure to the engineers of works to be of assistance to Associations like theirs; and such visits were of great value, because the actual practice of one works differed very largely from that of another. No doubt, they had observed this for themselves. Circumstances altered cases; and it was necessary to mould one's practice to the circumstances under which one was working. He could not say of the Wandsworth works that they were anything of a show works. The chief virtue they possessed was that they were able to furnish a fairly cheap supply of gas; and, after all, this was really the main thing. He wished they had the time and labour, not to decorate the works, but to make them neat. It would have been easy; but there was a war on, and this was the trouble. From his experience in the district the Government had been good enough to ask him to look after in regard to high explosives, he was happy to say that practically every gas undertaking, where it was possible to do so, whether municipal or company, had really done its level-best to get the highest extraction it could by the means it had at hand. In no instance could he find that they were making any profit, but, on the other hand, usually a considerable loss. He would again like to say how glad he was to see the members there. His Directors, too, were always pleased, and would always be pleased, to allow the members to go and see any of the works of the Company, provided the Association thought them of sufficient interest to justify a visit.

SCOTTISH JUNIOR GAS ASSOCIATION.

(EASTERN DISTRICT.)

Meeting at Dunfermline.

A Meeting of the Eastern District Section of the Scottish Junior Gas Association was held at the Gas-Works, Dunfermline, last Saturday, when there was a large attendance.

INSPECTION OF THE GAS-WORKS.

Previous to the meeting, Mr. Alexander Waddell, the Manager of the Dunfermline Gas-Works, conducted the members over the place, pointing out the additions and improvements necessitated by the extension of the gas undertaking to Rosyth. Visits were made to the new purifier, the exhauster room, and the new retorts. There are four new vertical retorts working at present, and, in addition to these, twelve others are being erected. It is hoped that great improvements in the working will be effected in connection with the new retorts. When the extensions are completed, the works will be able to produce 4,000,000 cubic feet of gas per day. The principal feature of the new purifiers is that they are deeper than the ordinary ones; and they have been so constructed that the gas can be either sent up or down or split into two—one stream going up and the other down in each purifier. The idea of handling the purifier material is to drop it down through the bottom at four different places, and gather it up in barrows. The barrows are to run into the cages and carry off the material to be put into the boxes. The barrows are lifted by a double-jibbed crane. In the new buildings, the lines of those put up by Mr. Newbigging have been followed.

THE BUSINESS MEETING.

At the meeting held later,

The PRESIDENT (Mr. J. Scott) said the large turn-out showed that the Eastern branch of the Association was still alive. No doubt the visit to Dunfermline was the cause of the good attendance. It was a great pleasure to be present that day to see the improvements which, under Mr. Waddell's engineering skill, were being carried out, in view of the developments at Rosyth. It was fitting that he should mention the loss by death since their last meeting of Mr. O'Connor, who had been one of their honorary members, and a very great asset to the Association. He was sure he voiced the feeling of the Association when he said that they missed Mr. O'Connor very much. He was glad to welcome, among others, to the meeting Mr. Fulton, of Helensburgh, the President of the Western district.

Mr. MACKIE DARLING (Aberdour) read the following paper:

GAS SUPPLY TO A NEW DISTRICT.

Having been prevailed upon by our President to contribute to the proceedings of this session, I intend to give you a brief description of the introduction of a gas supply to the sea-side village of Aberdour, which I have had charge of. It is so recent since Mr. J. D. Luck, of Markinch, gave a very interesting paper on the same subject, that I may be compelled to duplicate much of his information. Yet there may be some points of interest that may appeal to you.

Although Aberdour lies within easy reach of various surrounding gas-works, no one had ventured to lead a supply of gas thereto, until invited to do so by the Dunfermline District Committee of the Fife County Council; and the successful offerers were the Cowdenbeath Gas Company, by whom I was employed at the time. Till this time oil-lamps, and in one or two cases petrol air gas, held the field. The streets also were lit (when the moon did not appear) with oil-lamps fixed in ordinary gas-lanterns, mostly on cast-iron pillars—a few being fixed to the walls with brackets. Aberdour by this time had become a favourite summer resort, and, further, quite a number of important personages connected with the Naval Base at Rosyth had been attracted to, and taken up residence in, the village; and, naturally, the inhabitants wanted a more up-to-date system of lighting. The subject had been discussed by the inhabitants for fully 20 years, so at last the District Committee decided to introduce gas.

High-pressure supply is no new thing at Cowdenbeath—a supply to the village of Crossgates having been in operation for quite a number of years; so that the Aberdour system was simply an extension of the existing supply. My work did not bring me in close contact with the high-pressure main, so I do not intend to deal with it, but rather to confine myself to the part which came immediately within my scope. As you all know, the first work to be done in connection with a scheme of this kind is to get the street mains laid. I took up my duties at Aberdour early in June, 1914, so as to be able to commence operations along with the contractor who was to do the excavating work. I wish you to take particular note of the date of commencing the work, June 7, 1914, as the District Committee expected us to have all the street-lamps, 58 in number, lit on Aug. 15. Our Manager preferred to do the pipe laying and jointing with our own staff; so that this occupied a considerable part of my time, besides supervising the contractor's work in excavating and re-filling the track.

The pipes were from Messrs. Stewarts and Lloyds, and were of their well-known type—steel, with long sleeve joints. The water-traps and specials are all of cast iron; being cast with long sockets, and of smaller diameter than usual to take the steel main, and leaving only the same space for jointing material as the joints on the mains themselves. The jointing material used was ordinary spun rope yarn and molten lead. Some of you may ask why we did not use the more up-to-date lead wool for jointing; but it seems our Manager still considered molten lead quite as efficient as lead wool. One point I might mention—that before driving home each length, the spigot end was coated with tar (which made the pipe glide in much easier, and also filled up any space between the metals and helped to make a joint in itself), then the rope yarn was driven home, followed by the molten lead.

At one point in the district a bridge over the Edinburgh to Dundee main railway had to be crossed. On examination by the Railway Engineer, however, it was found to be impossible to get our pipe over the bridge on the roadway. An alternative scheme was put forward by the Railway Engineer—viz., to allow us to lay the pipe through the goods station, thence under the rails of the same line, and then on to the main roadway at a point further on than the bridge mentioned above. This was agreed to. In crossing under the main line, to avoid having any joint under the railway track, we obtained a 30-feet length of pipe, which carried us right across both sets of rails. The pipe at this point is

3 ft. 9 in. under the rails, so there should not be much danger of heavy trains disturbing the joints. At another point we had to cross another bridge over the same line. In this case we did get across the bridge, but with nothing to spare. From the crown of the bridge to the level of the road there is a depth of only 11 inches. To make sure of having the pipe protected, we filled in this point of the track with concrete. Altogether 3832 yards of mains were laid, consisting of 887 yards of 5-inch, 961 yards of 4-inch, and 1984 yards of 3-inch and 2-inch.

The next part of the work to claim my attention was the erection of nineteen new lamp pillars and the re-erection of many of the existing pillars to bring them into proper line. This was followed by connecting them up to the main pipe. At some points the lamps were erected on the opposite side of the street from the main; so that I had to cross the street with each service-pipe, to avoid having to cross the road when I started on lead services into the houses and shops. I ran a 1¼-inch service across to each lamp, and put on T-pieces before reducing to ½ inch to go up the pillars.

On examining the old lanterns, it was discovered that a number of them were useless for up-to-date incandescent lighting; so it was arranged to scrap the lot and get new ones. These were supplied by Messrs. Alder and Mackay, of Edinburgh. They are of very neat design. The only parts that are seen from the street are the controller on the bottom and the mantle hanging from the top—the brass tube from the controller to the burner going up a corner of the lantern. Each lamp is fitted with a stop cock; so that the gas can be shut off during the summer without interfering with the controller. The lamps are lit and extinguished by the firm's pressure wave controllers. So expeditiously was this part of the work carried through, together with that of laying forward the 4½ miles of high-pressure main (which was under a separate contract), that we were able to light 57 out of the 58 lamps on the date fixed by the District Committee—viz., Aug. 15, 1914.

Having completed the street mains and public lamps, I next turned attention to the laying of service-pipes to shops and private houses. The road authorities had decided to lay the principal thoroughfares with tar-macadam; but owing to our operations, they delayed the work, and now they asked us to complete the whole of our pipe laying, so that the newly-laid macadam might not be cut up by us making further connections. As the road authorities had been put to some inconvenience through delay, we decided to try and meet them in this matter, and it also allowed us to get all the tracks made good once and for all. Therefore, a careful survey of all the houses and buildings was made, and a scheme of service-piping mapped out so that all would have a good supply, at the same time saving as much pipe and time as possible. Pipes were laid across the street as far as the footpaths to all buildings, whether gas had been applied for or not; and the result has been rather surprising. It would appear that the nearer you take a gas supply to people's door the more chance you have of getting consumers, as at the present time there are very few of these cross-services lying idle. Some people asked us why we were laying a gas-pipe to their house when they had not asked for gas. The reply was that we were only getting ready, as we expected they would be asking for gas before very long; and in most cases this had the desired effect.

Before the Company offered for the gas supply, the Manager made up a statement of the number of houses, shops, workshops, &c., which might be taken as possible consumers. This worked out at a total of 436. To-day, after eighteen months' work, we have secured 315 of this number, and others are coming in slowly. The connecting of the service to the main is always an important part of the work; and here I can only repeat what was said by Mr. Luck at Edinburgh—we use the same saddle connection as was described and shown.

The placing and fixing of meters is also of importance; and we were careful to let it be known that we only were to decide where meters might be placed. The reason this step was taken was that we often found plumbers arranging for meters in bed-rooms and such places, causing a great deal of inconvenience if a connection for a cooker or fire is wanted, and also for meter reading. The fixing of the meter in many cases is the end of the gas company's work, but not so with us. During the time we were laying the mains and service-pipes, we also had a staff of gas-fitters fitting-up the houses. This work, of course, is all charged for. In most cases estimates were furnished in the usual way and accepted before the work was commenced, and many times we competed with the local plumbers.

It is a decided advantage to the consumer to have all the fitting work done by the gas company, because if there is anything wrong the blame rests entirely with the one party. Another advantage is we in almost all cases make provision for a cooker and fire connection; and it is to our credit to see that only the best material is supplied. Out of 315 consumers we have done the gas-fitting for 294; the total value of the work amounting to roughly £720. In addition to this, we have fixed free of charge 135 gas-cookers, 26 hotplates, and 112 rings and grillers. There have also been fixed eight gas-fires, two geysers, two gas-engines, and four gas-irons.

I am afraid I have given you a very general description of the scheme; but time will not permit me to enter on fuller detail of any particular head. Before closing, I would like to describe in a few words the gas supply itself. After getting a piece of ground, the Company decided to erect a gasholder at Aberdour. This, of course, was not ready on Aug. 15, when the gas was turned on; so we connected the high and low pressure mains together in a temporary way, with a small 2-inch mercurial governor between, to regulate the district pressure on Aberdour. On the inlet to the governor we had the pressure as delivered by the compressor; and it should be noted that the Crossgates district is also supplied from the same main through district governors. I would also draw attention to the fact that Aberdour is about 400 feet lower than Crossgates and Cowdenbeath—being on sea level.

The outlet pressure was set at 25-10ths; and this is never altered night or day. To operate the street-lamps, I simply add another weight to the little governor, allowing a trifle more pressure through for the time being. This system, however, required the constant running of the compressor night and day; and, being about 400 feet lower than the holder at Cowdenbeath, even a temporary low pressure supply was impossible. The completion of the gasholder altered things. The high-pressure main is now led direct into the gasholder, and on this main is fixed a cut-off inlet valve, which is operated by a back balance-weight from the holder itself—that is to say, when the holder is full up it engages and operates a weight which falls on the valve head, closing it tightly against the compressor. The holder therefore cannot get too full; and when it begins to fall, the valve opens and more gas passes in.

Possibly the most interesting part of the scheme is the arrangement whereby the compressor can be stopped at any time—for cleaning, repairing, or even to save steam—and still a supply be automatically maintained on the high-pressure main sufficient to supply the few consumers thereon in addition to the Crossgates district. This is accomplished by fixing at the holder a return valve, which is operated by a diaphragm governor connected to the high-pressure main. If the compressor is stopped, the pressure falls at once. This releases the return valve, which opens up and allows the gas in the holder to pass back the high-pressure or inlet main; and in this way the holder takes up the duties of the compressor for the time being. The holder gives 5½ inches of pressure; and this, added to the 400 feet altitude, gives quite sufficient pressure all along the line of the high-pressure main. One important point is that no one requires to be stationed at the holder—the whole arrangement being quite automatic.

DISCUSSION.

Mr. WADDELL moved a vote of thanks to Mr. Darling for his interesting paper. He had shown an admirable way of getting over difficult matters. There was hardly any end to circumstances with which, if put to it, they might be able to cope. High-pressure lighting had very much widened their sphere of operations in this directon.

Mr. H. RULE (Kelty) said they would have appreciated the paper much more had it been read at Aberdour, where they could have seen the holder and the difficulties that had cropped up. He was astonished that Aberdour had remained so long without a gas supply. They had suffered very much at Kelty from the difficulty of deciding where the meters should be placed. A number of the miners' houses there had the meters in the front room; and when the Company had to put a cooker in, the whole house had to be disturbed, and a lot of piping had to be employed. He was pleased to hear that the outlet pressure at Aberdour was never altered night or day—a most desirable state of affairs. At Kelty they were very timid as to leakage, and about twelve o'clock at night they turned it down. This was done in 90 per cent. of places.

At the conclusion of the discussion, a vote of thanks was accorded to Mr. Darling.

THE SOCIAL SIDE.

Later in the afternoon, the Gas Committee entertained the members at tea in the Royal Hotel, Dunfermline. This was followed by a musical programme given by members of the Association.

The CHAIRMAN (Mr. J. Scott) moved a vote of thanks to the Gas Committee for the splendid way in which they had entertained the members, and to Mr. Waddell for his kindness in showing them over the works, and for the time and trouble he had expended to make their visit a success.

Mr. WADDELL, in acknowledgment, said he was one who had a very sanguine idea as to the good that could be done by such an Association as theirs, and he had no doubt that as time went on this would be more and more confirmed.

Mr. DAVID FULTON (Helensburgh) conveyed a fraternal message from the Western branch of the Association. He said the turn-out that day had been very good, when they considered the circumstances of the present time and the difficulty members had in getting away from their works. He was much pleased with Mr. Darling's paper. He was sorry the war had prevented the joint visit of the two branches. This year Professor Smithells was to deliver the introductory lecture to the Western branch. They all knew of his eminence as a chemist; and they expected to derive great benefit from his lecture.

Meter Parts for Australia.—It is announced that the Commonwealth of Australia Department of Trade and Customs have issued a bye-law cancelling previous bye-laws and specifying "parts of gas-meters" which may be admitted to the Commonwealth. They are now subject, under the general tariff, to a 10 per cent. *ad valorem* duty; but under the British preferential tariff they are admitted free. As regards locks and brass unions, security must be given that these will be used only in the manufacture of gas-meters, and evidence of such use furnished to the collector within six months (or such further time as the collector may allow) after delivery by the Customs.

LEGAL INTELLIGENCE.

LEISTON PUBLIC LIGHTING CONTRACT.

HIGH COURT OF JUSTICE—KING'S BENCH DIVISION.

Tuesday, Feb. 1.

(*Before Mr. Justice* LOW.)

Leiston Gas Company, Limited v. Leiston-cum-Sizewell Urban District Council.

This action, which raised a question as to the liability of authorities in respect of public lighting contracts, having regard to the regulations under the Defence of the Realm Act, was heard on the 22nd ult. [*ante*, p. 211], when judgment was reserved. The Company claimed £157 15s. 9d. for services rendered to the Council under a contract entered into in 1911. The defendants denied liability, on the ground that the Company had not supplied gas during the period for which they claimed, in consequence of an order made by the military authorities.

Mr. MATTHEWS, K.C., and Mr. RAYNER GODDARD were for the plaintiffs; Mr. HAWKE, K.C., and Mr. POYSER, for the defendants.

Judgment.

His LORDSHIP, in giving judgment to-day, said: In this action, the plaintiffs, the Gas Company, claimed from the Local Authority the sum of £157 15s. 9d., being three quarterly payments said to be due on March 31, June 30, and Sept. 30, 1915, under an agreement entered into between the parties, dated June 2, 1911. The agreement was for five years from Aug. 1, 1911, and to remain in force until determined by either party giving six calendar months' written notice expiring on July 31, 1916, or July 31 of any subsequent year. No notice to determine the agreement had been given. By clause 2 of the agreement, the plaintiffs undertook to provide by Aug. 11 columns, lanterns, and burners, and to maintain same; the whole of the plant remaining the property of the Company. This obligation was duly performed. By clause 4 it was provided that during the contract period plaintiffs were to supply gas, light, extinguish, clean, paint, and repair the lamps; and it was not alleged that this obligation had not been performed, with the exception that the supply of gas was stopped. By clause 10 it was provided that if the Company should fail to light any lamp, unless the failure was due to circumstances beyond their control, they were to pay penalties to the defendants. The defendants did not rely on this clause, and therefore he would express no opinion upon it. Under the powers of the Defence of the Realm Act, orders had been made which at first stopped the lighting of some of the lamps, and afterwards the whole of the lamps referred to in the agreement. From the 1st to the 26th of January, only 26 were lighted; but after Jan. 26 none of the lamps were lighted. In these circumstances, it was contended, on behalf of the defendants, that immediately the Order was made forbidding the lighting of the lamps, the agreement came to an end, and plaintiffs were entitled to remove the plant and defendants were absolved from making any further payments. In support of this proposition, several authorities had been cited.* He had first to consider what the contract was. It was not only a contract to furnish light, but for a given period the necessary plant; and it was impossible to distinguish how much was for the lamps and how much for the actual gas consumed. On a five years' contract, it was not improbable that the gas was the larger amount. He had next to consider whether the supply of gas in defendants' district had become unlawful within the meaning of the authorities relied upon. In times of emergency power was given to the Local Authority to suspend lighting; so that the provision as to lighting within the defendants' area became unlawful. What the Court in the cases cited had to consider was whether the state of things rendered the carrying out of the contract unlawful or impossible; but in the case he had to consider it was impossible from day to day, or from week to week, to tell whether it would be necessary to stop all, or some, of the lights. The plaintiffs might be ordered on the repeal, or relaxation, of the restriction to go on with the lighting, and to keep the plant in working order, and it was not material that the restriction had turned out to be of very considerable length. The contract was an executed contract; and it was impossible to divide the charge per lamp, and to say that so much was due for gas and so much for the lamps. He had come to the conclusion that, by the exercise of the power under the Defence Act by the defendants, the performance of the contract had not been rendered unlawful or impossible. In the course of the proceedings he had seen certain correspondence that had passed between the parties which had not been put in, and therefore it did not affect the legal position. From the letters he gathered that the plaintiffs had desired to come to some equitable arrangement by which the defendants should have credit for gas not consumed. This suggestion the defendants declined to accept or even consider. It seemed to him a pity they did not do so, and it would surely have been a wise and fair thing in this case and other cases of the sort (should any arise) for local authorities, rather than spend the ratepayers' money in litigation, to come to some such arrangement as was suggested by the plaintiffs. Perhaps it would be better still if Parliament could find time to insert in one of the emergency Statutes a clause providing for equitable adjustment of such a dispute as this, and so prevent local authorities being tempted to incur the expense of litigation in circumstances similar to those in this case. With reference to the defendants' contention that the contract should be treated as suspended while the Emergency Act was in force, he thought there was no ground for doing so. Judgment must therefore be entered for plaintiffs for the amount claimed, with costs.

Mr. HAWKE asked for a stay of execution.

Mr. MATTHEWS said plaintiffs claimed interest on the amount due; but if the case was not carried further, they would waive this.

His LORDSHIP said he had not calculated the interest.

Mr. MATTHEWS: Then we will say no more about it.

A stay of execution was granted, upon defendants entering an appeal within fourteen days, the costs to be paid on the undertaking of the solicitors to return same in the event of the appeal being successful.

* These were: Esposito *v.* Bowden 7 E. and B. 764, Baily *v.* De Crespigny L.R. 4 Q.B. Cas. 180, Krell *v.* Henry 1903 2 K.B. 740, Geipel *v.* Smith L.R. 7 Q.B. Cas. 404.

GAS MANAGER'S WIDOW CLAIMS COMPENSATION.

Sequel to the Death of Mr. E. H. Millard, at Cowes.

His Honour Judge PERCY GYR, at the Isle of Wight County Court last Wednesday, had before him an application under the Workmen's Compensation Act by Mrs. Frances Mary Millard, widow of the late Manager of the Cowes Gas-Works, for compensation for the death of her husband under circumstances recorded in the "JOURNAL" for Oct. 5 last [p. 47]. The respondents were the Cowes Urban District Council, who are the owners of the gas-works.

Mr. DUNCAN appeared for the applicant, and Mr. SHAKESPEARE for the respondents.

Mr. DUNCAN said that the applicant's husband, the late Edward Henry Millard, was Manager and Engineer of the Cowes Gas-Works. On Sept. 27 he met his death, which was caused by *angina pectoris*, accelerated by gas poisoning. There were three dependants in addition to the widow—two girls, aged 11 and 5, and a lad at sea, for whom apprenticeship indentures were being paid for two years. The respondents said that deceased was not a workman to whom the Act applied, and that as he was Manager and Engineer of the gas-works earning more than £250 a year, applicant must show that he was a manual labourer as well. He should prove that the late Mr. Millard was engaged on manual labour by reason of strike troubles and shortage of labour, and still more since the outbreak of war, when he had been shorthanded. He had had to take off his coat and act as stoker at night for hours at a time. Moreover, he was actually engaged as a manual labourer when his death took place, as he was in the act of installing a governor on the retorts when the gas fumes became so bad that he was overpowered, with fatal results. The work on which he was engaged involved the cutting of a gas-pipe.

His HONOUR: How came it that he was allowed to cut a pipe while gas was passing through it?

Mr. DUNCAN: He was Manager and Engineer; and he himself decided to take the risk rather than keep the town of Cowes in darkness for 24 hours. He risked his own life in doing it, and lost his life. He did not anticipate the gas fumes would have such an effect upon him.

His HONOUR: He thought he could stand the gas which came out?

Mr. DUNCAN: Yes, as he might have done if he had not been suffering from *angina pectoris*. Another man was even more badly affected at the time; but, having a strong heart, he did not die.

Mr. SHAKESPEARE: This governor had nothing to do with the lighting.

Mr. DUNCAN said no doubt death was accelerated by gas poisoning. Numerous cases under the Workmen's Compensation Act were recorded of accidents in connection with the cutting of gas-pipes.

His HONOUR asked if an appeal was likely to follow in the case.

Mr. SHAKESPEARE: Certainly.

His HONOUR thereupon suggested that it would save the time of the parties, and of the Court, as well as probably reduce the costs, if both sides agreed to a shorthand note being taken under his (the Judge's) supervision.

Counsel then conferred, and,

Mr. SHAKESPEARE announced that they had settled the case, subject to his Honour's approval. The terms of settlement were: £25 for the widow, and £25 for costs. In his (Counsel's) view, it would have been impossible for his Honour to have held that Mr. Millard was a workman who came under the Act, because he received a salary of more than £250 a year. In fact, he was employed by the respondents under a written agreement by which he was Manager of the works, and was in the position to take pupils.

His HONOUR: It does not come within the definition of the Act.

Mr. SHAKESPEARE said the second ground upon which he relied was that his Honour could not have found that there was any evidence of acceleration of death at all. However, he felt that, whatever the result of these proceedings, whether they won or lost, the respondents would have to pay a considerable sum of money; and, in these circumstances, he had advised his clients that it would, perhaps, be in their interests, pecuniarily, if they paid the £50, as now proposed, to cover everything.

Mr. DUNCAN said he quite recognized the difficulty of proving that Mr. Millard was engaged in manual labour, and also other difficulties in the case.

Mr. SHAKESPEARE said that the form of his Honour's judgment would be "award by consent, the respondents denying liability, for £50—£25 for the widow, and £25 for costs."

Judgment accordingly.

A Curious Workmen's Compensation Claim.

In the Bow County Court, on Jan. 31, before his Honour Judge Graham, K.C., an application was made under the Workmen's Compensation Act. The applicant was Mr. John Chamberlin, one of the Ilford Board of Guardians, on behalf of Frances Kate Huntley and her eight-year old son John; the respondents being the Gas Light and Coke Company. The amount claimed was £300. Mr. Bickmore appeared as Counsel for the applicant, and Mr. Robinson for the respondents. Counsel said the facts were rather remarkable. The

man died of injuries sustained at the Beckton Gas-Works—liability for which was not denied—at which time he was paying for the upkeep of his wife in the lunatic asylum at Goodmayes. From time to time she sufficiently recovered to come out, but always had to go back. The boy of eight died one month after the father; and a peculiar legal situation therefore arose. The widow—being a lunatic—was chargeable to the Guardians; and Mr. Chamberlin had been deputed to watch the interests of the parties concerned. The point was as to the boy. Was he entitled to the full £300, as he had lived longer than his father, or only a small sum, and, anyway, how was the money to be apportioned? Then, again, who was to have charge of the money, whatever was awarded—the Court or the Guardians? Mr. Bickmore said he thought the difficulty could be got over by the Court taking charge. The deceased was a boiler maker, working as a plater, and was moving a chain on an overhead track when he fell into a hopper, receiving such serious injuries that he died almost immediately. Judge Graham ordered the £300 to be paid into Court, but said that for the time being he did not know what would become of it.

Sewers Blocked by Pitch at Manchester.

On Monday of last week, at the Manchester County Court, before his Honour Judge Mellor, K.C., an action for damages was brought by a licensed victualler named Hall, of the Victoria Inn, Clayton, against the Manchester Corporation, and the Manchester and Sheffield Tar-Works Company, Limited, also of Clayton, for damages alleged to have been caused through the flooding of his cellars by sewer water in August. The case against the Company was that they had failed to provide means to prevent the water backing-up through the connecting drain into the plaintiff's cellars; and against the other defendants it was alleged that they had allowed tar or pitch from their works to escape into the sewer and so cause an obstruction. Evidence was given by the plaintiff and his wife to the effect that on one particular occasion the water in the cellar was about waist high. Liability was admitted on the part of the Tar-Works Company; but Counsel for them argued that his clients should not be saddled with the costs of the Corporation, in addition to their own. He did not admit that the Tar-Works Company alone were liable. For the Corporation, it was submitted that there was no case against them; and reference was made to a letter of the Tar-Works Company expressing regret that the action of their own servants had resulted in the pitch blocking the sewers. His Honour dismissed the Corporation from the action, and gave judgment for the plaintiff against the Tar-Works Company for £17. He ordered them to pay the costs of all parties.

"Dutch" Gas-Mantles Forfeited.

In October last ["JOURNAL," Vol. CXXXII., p. 652], some cases of incandescent gas-mantles, consigned by a Dutch firm to an agent in Edinburgh (C. I. Michaelson) were seized by the Customs Authorities at Leith, in respect that the goods were imported into the United Kingdom contrary to the Customs (War Powers) Act, 1915. At the commencement of proceedings in the Edinburgh Sheriff Court in December, the Works Manager of the Welsbach Light Company expressed the opinion that the sample mantle produced was undoubtedly of German make. The case was adjourned to the 17th ult., and again to the 31st, for the purpose of getting two witnesses from Holland to give evidence on behalf of the defendant Michaelson. On the case being called on the latter date, defendant's Counsel stated that, despite letters and telegrams, he had not yet been able to produce the witnesses; and he asked for another adjournment. The Sheriff refused the application, and granted the petition for forfeiture of the mantles. It is understood that an appeal is to be lodged.

Breach of a Sulphate of Ammonia Contract.

Last Tuesday, Mr. Justice Bailhache delivered his reserved judgment in the King's Bench Commercial Court in the case in which Messrs. Mitsui and Co., Limited, of Lime Street, sued Messrs. Watts, Watts, and Co., Limited, of London and Cardiff, to recover damages for breach of a charter party of June 5, 1914, in regard to the carriage by steamer to Japan of a cargo of 3500 tons of sulphate of ammonia. The plaintiffs contracted with the defendants for them to send a steamer to Mariopol, in the Sea of Azov, in September, 1914, and there load the cargo and take it to Japan. Defendants failed to send the steamer, pleading the war as justification. Plaintiffs bought the ammonia from Evence Coppée Company; and the latter's claim for damage for non-acceptance by the plaintiffs was settled for £4500. Mr. Justice Bailhache did not think the defendants could plead the closing of the Dardanelles as an excuse for their breach of contract. He thought the plaintiffs were entitled to recover as damages against the defendants the sum of £3800 profit that they would have made if the goods had been carried to their destination; but the £4500 that they had paid to their sellers as compensation was too remote as damages against the defendants. Judgment was entered for the plaintiffs for £3800 and costs.

Cannock and Hednesford Gas Company.—The nineteenth annual report of the Cannock, Hednesford, and District Gas Company shows total receipts for the past year amounting to £21,454, and a total expenditure of £16,738, leaving a balance to the credit of the profit and loss account of £4716. A dividend of 7 per cent. is recommended, leaving a balance to be carried forward of £935. The expenses connected with the manufacture of gas amounted to £9885; for the distribution, £2169; and lighting and repairs of public lamps cost £501. The sales of gas, including £963 4s. 6d. for public lighting and contracts, realized £16,223. Residual products gave an income of £3932. The total quantity of gas sold was 90,428,000 cubic feet.

MISCELLANEOUS NEWS.

THE GAS LIGHT AND COKE COMPANY.

The Half-Yearly Ordinary General Meeting of the Proprietors was held last Friday at the Chief Office, Horseferry Road, Westminster—Sir CORBET WOODALL, M.Inst.C.E. (the Governor), in the chair.

The SECRETARY (Mr. Henry Rayner) read the notice convening the meeting.

DEATH OF SIR HUGH OWEN.

The GOVERNOR: Ladies and Gentlemen, It will be noticed that a chair on this side of the table is vacant this morning. The death of Sir Hugh Owen has been a great loss to the Company, and a very heavy blow to his colleagues. Sir Hugh was a man of great wisdom and knowledge; and he was, at the same time, as loyal and as kindly a colleague as man ever met with. He had opinions of his own, but was always considerate for those of others. It is no exaggeration to say that all his colleagues loved him.

THE GOVERNOR'S SPEECH.

The GOVERNOR: Ladies and Gentlemen, as usual I presume we may take the report and accounts as read. In moving their adoption, I have not very much to say. For the fourth time we meet under the dark cloud of war, and practically every item of our accounts is affected by that sad fact. In August last, I explained that, in order to make our income balance the expenditure, it had been found necessary to raise the price of gas a second time (from 2s. 8d. to 3s. per 1000 cubic feet) from the end of March, 1915, and this had accordingly been done. The advantage of the higher rental attached to only one-half—and that the lighter one—of the June half year; but so also the full burden of heavier costs did not apply, by reason of delays in delivery of coal and other necessaries. The result was that the desired balance was secured, with a margin to the Company of a little over £50,000. In the half year under review, the proportion of coal and oil purchased at higher prices has been considerably greater, and the expenses consequently heavier. This notwithstanding, the higher price of gas having operated throughout the whole period, and for other reasons which I will explain shortly, we have been able to pay our way, provide the statutory dividend, and make a further small addition to the balance carried forward. Owing to the smallness of our working capital, which is but little more than £500,000, the balance on net revenue is of great value. Before we can call up more capital we shall apply to Parliament for an alteration in the terms upon which we may issue the £750,000 of 3 per cent. debenture stock granted to us in 1903.

THE CARRY-FORWARD.

I have recently received an unsigned letter from a shareholder, in which he politely calls attention to the large amount of our carry-forward, and asks whether it is not more than is necessary, and might not be applied to making what would be a welcome addition to the dividend. Many shareholders seem to find it difficult to appreciate the fact that our dividend is governed, not by the amount of profit earned, but by the price at which the gas is sold. It would tend to satisfy any such shareholder if he would study the accounts of the Company for the last three years. From these he would see that the amount to carry forward has been reduced in that period by about £250,000 sterling. Had it not been for the increase in the price of gas, we should now have entirely wiped out that valuable fund. We have no intention at present of making such an application to Parliament as I have said is necessary. The alternative is to keep a substantial balance to the credit of our net revenue account, and at the same time to limit works expenditure, if possible, so that it does not exceed the sum allowed for depreciation. The capital spent last half year was £71,898, while the depreciation was £128,316; the result being an improvement of £56,418 in the floating balance.

THE REVENUE ACCOUNT.

A few figures from the revenue account are interesting. As compared with the corresponding half of 1914, coal cost more by 5s. 3d. per ton, or £227,739 Of this increase, the amount due to the higher price was £214,481; the balance being due to the larger quantity. Oil also was dearer by £14,847; coke and breeze for carburetted water gas cost £14,765 more—the total for raw materials being an excess of £257,351. Against this, residual products improved by £202,017; leaving a net excess cost of £55,334. All the residual products yielded satisfactory prices. Among those are a number of articles not previously made by us, the provision for which has involved considerable alterations in the appearance of the Beckton Chemical Works. The new manufactures have been partly undertaken at the request of the Government for war purposes; and others in aid of the dyeing industries. I hope the word will not be misunderstood. The sooner we cease producing the former for the purposes to which they are now applied, the more pleased we shall be; but we hope to retain the latter indefinitely. We have started new industries which we believe will be a source of profit to us. These new and urgent demands have put a severe strain upon Mr. Adam, the Manager of the Products Works; and I am glad to acknowledge the ability and devotion with which he has given himself to the work.

REPAIRS AND MAINTENANCE.

Under the heading of "Repair and Maintenance of Works and Plant" there is a larger amount by £50,960. This includes £15,000 for a dismantled gasholder at Bethnal Green; the balance being chiefly for advanced wages, and the higher cost of fuel for boilers and sundry purposes. Upon the question of rates and taxes, the past year was the quinquennial period when the assessments of the London boroughs are revised. The whole of those in which the Company are interested are now concluded, and the result, I am glad to say, shows material reduction in the amount. The war wage and bonus on salaries totalled in the half year to £67,252. This sum is divided under various headings on the accounts.

INCREASED OUTPUT AND REDUCED UNACCOUNTED-FOR GAS.

The fact that there has been an increase of 1½ per cent. in the quantity

of gas sent out is, to my mind, very satisfactory, having regard to the continued reduction of the public lamps and outside shop lighting, as well as the very material shortening of the hours of opening of licensed houses. The increase in the price of gas has also certainly tended to diminish the consumption. The inference from this is that, had it not been for the adverse conditions created by the war, the increase in the Company's business would have been large. Another satisfactory circumstance is that the percentage of unaccounted-for gas has been reduced. The proportion of carburetted water gas made in the half year was less by reason of the higher price of oil delivered to us. This is owing chiefly to increased cost of conveyance from America to England. Consequently upon this, the quantity of coal carbonized has been greater, and that of residuals produced necessarily larger. This has been a double advantage. It has enabled us to supply the Government with a larger quantity of materials of great value to the War Departments, and also, by diminishing the consumption of coke used in manufacture, to maintain the supply of domestic and industrial fuel.

A TRIBUTE TO THE "WORKING CLASS."

I have already stated that the amount paid for manufactory wear and tear wages has shown a very large increase. I am bound to say that for my part I do not grudge this. There can be no doubt as to the great rise in the cost of the means of living; and the margin at the disposal of the working class as a whole was not sufficient to cover this. I believe that those whom we entitle the "working class" are as keen for the success of our arms in the war as any other class; and I trust that they will learn more fully from week to week how largely and comparatively easily they can contribute their share to the country's success in the great struggle in which it is engaged. We note that when engaged upon the actual manufacture of munitions or other materials to be directly employed by our soldiers, there is a keenness greater than is in evidence generally when they are occupied in their ordinary duties day by day. What we wish them to realize is that by putting into their daily work all the enthusiasm and vigour of which they are capable, they will be serving their country's cause as truly as those who are fighting at the front. The net revenue account shows that the Directors have written-down the book-value of their investments by £24,897. This is not quite to the market price; but it is a long step towards it, and we think it is sufficient for the present. A sum of £10,000 has been carried to the special purposes fund. Although the Directors have taken out policies against air risk for certain parts of the works, they do not think it advisable, owing to the heavy cost it would involve, to insure the whole of their property. They therefore prefer to strengthen the special purposes fund, which, you will recollect, was previously called the insurance fund. This stands at something over £300,000. Whether the Directors will reconsider the question of largely increasing the insurance, owing to recent developments, is a matter for consideration.

TRADING RESULTS FOR THE HALF YEAR.

The result of our trading for the half year is a balance of £604,314, as compared with £449,510 for the same period of 1914. After charging against this the items set out in the net revenue account—interest, dividend on special funds, &c.—and adding the balance brought from the last account, we have available for dividend the sum of £794,485. Out of this, the Directors recommend the payment of dividend at the rate of £4 4s. per cent. per annum; and if this is approved, they will carry forward £446,615, as against £384,538 a year ago. Looking at all the circumstances of the half year, I think the result is a good one; and I hope the current period may prove no less satisfactory.

COAL AND FREIGHTS.

The anxieties and troubles we have gone through have been many, and those in front of us are not likely to prove less. We can bear the inevitable with patience; but I resent some which appear to me unnecessary. A year ago I drew attention to the grave burden placed on users of coal in London and elsewhere by the heavy rates charged for shipping freights from the Tyne and Yorkshire ports to London. I pointed out that the large numbers of collier ships commandeered by the Government at the outbreak of war were at that time earning a rate of about 3s. per ton from the Tyne, and that the price paid for them by the Government equalled about 4s. per ton—yielding to the owners a very good profit, with which I believe they were fully satisfied. The number of ships withdrawn was so great that there were not enough remaining to bring to London the coal required; and upon a petition of users, certain enemy ships interned in our ports were released and placed at the disposal of the trade. It will be noticed that it was not the ships commandeered by the Admiralty which were returned (ships built for the trade, and which might be said to know their way to and fro almost like bus horses on their routes), but the strange enemy ships—some of them sadly unsuitable for the purpose. There was then a serious lack of ships; and competition being removed, the freights charged were ruinously high. These inflated freights the Government called "market rates," and asked owners, who were receiving from them 4s. per ton for good collier ships, to pay as high as 14s. 6d. per ton for the make-shift and inferior enemy ones. Thus early did Government come under the pernicious and abominable influence of the idea of "war profits." Under the operation of the London Coal Supplies Advisory Committee, who meet in these offices and apportion the interned boats among the representatives of the Public Utility Bodies, and of which our General Manager is Chairman, the freights charged have been less than those commonly demanded; but they are high enough to be greatly burdensome, and to furnish a welcome encouragement to those who insist on the highest terms that can be exacted. At present the position is peculiarly onerous and perplexing. As the shareholders are aware, we are engaged in the most strenuous efforts to make munitions and to produce materials for the manufacture of high explosives. We receive from the Technical Departments of the State urgent requests to furnish the uttermost pound obtainable, and, I am glad to say, also cordial acknowledgment of what we are doing. As the products so valuable to the fighting forces are all wasted where coal is burnt in open grates, and can only be obtained when coal is distilled in closed retorts, citizens are advised in Great Britain, in the countries of our Allies, and in those of our enemies, to refrain from burning the raw coal to destruction, and to use either gas or coke instead. If more gas is to be consumed, largely for these patriotic reasons, its price must be kept as low as possible; yet the opposite of this is the effect of the policy of high freights adopted by another Department of the Government. If the Company are compelled to pay 5s. per ton more for delivery of their coal than is necessary, the extra burden will amount to about £400,000 per annum; and that, passed on in a considerable part to the consumers in the price of gas, must greatly reduce the succour we are able to render to the War Office and Admiralty. It is difficult to conceive of divided interests over such a matter; and yet there they are—clearly operating. Also, since the war began, nothing has been more humiliating than the struggle so generally evident in certain quarters to make private profit out of the tragical circumstances in which the country is plunged. The decision of the Chancellor of the Exchequer to take for the benefit of public funds half of the plunder which is obtained, has given countenance and encouragement to the practice, and is, to my mind, deplorable. If such profits are to be allowed, surely the whole should go to the State. I am told (but cannot vouch for the fact) that there are British ships trading to-day between foreign ports, and never coming to England lest the owners should be called upon to contribute their share to her needs. Can any contempt be too deep, or censure too outspoken, for such traders on their country's hardships? I am glad to know that at last the Government has appointed a Committee to take control of all the nation's ships, and see that they are fully used in the most urgent services, and that reasonable freights are charged for them. Let us hope that this Committee will speedily get to work, and make its power felt in the right quarters.

THE COMPANY'S SHIPS AND RUNNING COSTS.

To meet in some measure the very heavy burden of freights, we have, as you are aware, purchased certain ships. One—an excellent one—the "Fulgens," built especially for us, was torpedoed on Aug. 1 last; a second, the "Ignis," went the same way—leaving us with three of our own, one hired by the year, and a fifth on the stocks, or I hope it is. Our own ships cost for running 3s. 2d. to 4s. 11d. per ton during the half year just closed. This is an instructive comment on the 10s. to 14s. rates now being paid to the Government and the high freights demanded on the market for outside tonnage. The two ships lost saved all their crews, and were fully insured as to the ships and the cargoes which they carried. Other ships have been bought to replace them. We have now eight ships, either of our own or chartered for us by the year.

COAL PRICE LIMITATION.

Last year, at the instance of the public utility services, especially those engaged in electricity and gas supply, an Act of Parliament was passed limiting the amount by which the pre-war price of coal should be increased. This was approved by a Committee upon which coalowners were duly represented. I am sorry to say, however, that the Act was no sooner passed than ingenious minds were directed to making it as little operative as possible, and to swell further than the Act contemplated the profits accruing to owners and agents.

VALUE OF CO-PARTNERSHIP.

Where costs of manufacture are increased, the prices charged will, where possible, be raised also; and this is but reasonable. Our industry is practically the only one in which a rise of price must be accompanied by a decrease in divided profits. In most others the increase of profits is secured by an increase of price. The system of co-partnership introduced into the gas industry by the late Sir George Livesey ensures that if, by any means (especially by greater energy and enterprise) the price can be lowered to the public benefit, the proprietor reaps advantage and the workman co-partner gets an increased bonus, in addition to the satisfaction of knowing that he is doing a man's work for his country. The appreciation of this is, I believe, growing among the Company's staff as a whole. I wish with all my heart that a similar system were adopted by other great public service undertakings, and regret that, while such an arrangement for distributing extra profits remains peculiar to statutory gas companies, it must remain unknown to, and consequently unappreciated by, what passes for popular opinion.

ADOPTION OF THE REPORT AND ACCOUNTS.

The GOVERNOR: I have pleasure in moving:

> "That this meeting do agree with, and confirm, the report of the Directors and the Auditors' report and statement of the accounts of the Company as transmitted to the proprietors on the 27th ult."

Before putting the resolution to the meeting, I shall be happy to hear any remarks which proprietors may wish to make, and to endeavour to answer any questions they may ask.

The DEPUTY-GOVERNOR (Mr. John Miles): I beg to second the resolution.

PROPRIETORS' APPRECIATION.

Mr. W. A. HOUNSOM thought the first word from his side of the table should be one of sympathetic endorsement of the remarks which had fallen from the Governor on the decease of Sir Hugh Owen. The shareholders had lost an able representative on the Board, and the Directors had lost a capable, conscientious, and courteous colleague. He thought the shareholders often lost something by not realizing what the meeting was. The report stated it was the "half-yearly ordinary general meeting;" but it was the meeting of the Company. It was true the shareholders were present only in a small number—and he had often expressed a wish that more would attend—but even the small number present were representatives of the Company. There was another matter they must remember that, after all, the Directors, exalted as their position was, were really part and parcel of the Company—being the representatives to carry on the business. The Company was a democratic affair, and proprietors were entitled to come to the meetings and ask any questions more or less wise, and to criticize in a manner more or less relevant or irrelevant. He said this because then he thought he should get at the real basis of sympathy between those present, treating the Directors and proprietors as a whole. Having said this, he was entitled to say what the Governor, with his modesty, would not say—that the result of the half-year's working had been remarkable. The fact that there was a small balance to the good was in itself a high tribute, not only to the Board but to all the officers of the Com-

pany in the adjustment of the items of expenditure and revenue so as to bring about such a happy result. They might look still farther, and go to capital account, and congratulate themselves as a whole on the fact that the balance had gone up £112,000 in the year. It was extremely difficult where the figures were so large to come to real ultimate conclusions; but all these facts were facts in their favour. He confessed that a short time ago he looked forward to the possibility of a necessary indication of a rise in the price of gas, and he rejoiced that to-day there was not a whisper of the point. He wished to go one step farther, and say from his side of the table there should go forth a deep expression of sympathy to those who had borne the heat and burden of the day. Some 2600 men in the pink of life had gone from the Company to the front; and the Board and the staff had had to meet the demands of the public and of the Government with a depleted staff. He noticed from the "Co-Partnership Magazine" that the Board had recently introduced a new element into the staff—viz., female labour. All these things the shareholders ought to take into account when they paid a tribute to the work of the Board, the staff, and the workmen, as he desired to do most heartily. In these times of stress, they ought to think over the work that had been done in order to strengthen the bond of sympathy between themselves and the workmen. He looked forward, not without some anxiety, but with great hope, to the future. The true prospective of the strenuous times through which they were passing would never be available to many in the room; but when that vision came, with the lofty ideals which prevailed in the country, the verdict surely would be that they had done their best, and that that best had resulted in benefit to all concerned.

Mr. J. H. NELSON asked what was the meaning of the special purposes fund. They had been told it was chiefly an insurance fund; but he rather forgot what were the other purposes covered.

The GOVERNOR: The insurance fund was definitely limited to certain purposes, and the special purposes fund was broadened in ways that were explained to the Houses of Parliament and are embodied in the Act of Parliament. We are able to use it for the removal of works from one site to another, for the reconstruction of works of a special character, and so on. Now let me thank Mr. Hounsom for the cheering words he has addressed to us, and for the appreciation, which he never lacks, of the stress and strain which come at times on the Board, the staff, and the workers of the Company. The work of the past six months has been of a character which has necessitated our General Manager (Mr. Milne Watson) taking a rest for a time, and has had its influence on many of us to a serious degree. With regard to the men who have gone to the front, we are very proud indeed of them, and we expressed it in a message which we sent to all of them at Christmas, and which has been acknowledged by many of them with high appreciation. We have in our employ, taking the place of some of the men, about 420 girls and women, who are doing their work most admirably. This has involved a considerable amount of labour of one sort and another, adapting the premises to the convenience and use of the girls—one room has been prepared as a sitting-room for them. We have not neglected to take what care we can of them.

The resolution was put and carried unanimously.

THE DIVIDEND.

The GOVERNOR: I will ask the Secretary to read the minute with regard to the dividend.

The SECRETARY then read from the Directors' minutes the following:

> Resolved: That it be recommended to the half-yearly ordinary general meeting of proprietors to be held on the 4th prox.:
>
> (1) That the sum of £5000 be set aside out of the divisible profits of the Company for the half year ending on the 31st day of December last towards the redemption fund, in accordance with the provisions of the Company's Act of 1903.
>
> (2) That a dividend as follows for such half year be declared—viz.:
>
> On the 4 per cent. consolidated preference stock at the rate of £4 per cent. per annum;
>
> On the 3½ per cent. maximum stock at the rate of £3 10s. per cent. per annum;
>
> On the ordinary stock at the rate of £4 4s. per cent. per annum;
>
> subject to deduction of income-tax.

The GOVERNOR: I beg leave to move the adoption of these recommendations.

The DEPUTY-GOVERNOR seconded the motion, which was put and carried unanimously.

RE-ELECTION OF DIRECTORS AND AUDITORS.

The GOVERNOR: I have now much pleasure in proposing the re-election of Mr. Herbert Jameson Waterlow as a Director of the Company. I was very hopeful of the services which Mr. Waterlow would render to us when he joined the Board, and that hope has been more than fulfilled.

The DEPUTY-GOVERNOR: I have much pleasure in seconding the motion. I happen to have known Mr. Waterlow for several years, and I am sure what the Governor has said with regard to him is perfectly accurate.

The resolution was unanimously carried.

Mr. WATERLOW expressed thanks for his re-election.

The DEPUTY-GOVERNOR: I have now the pleasure of proposing the re-election of Mr. Henry Woodall. He has an advantage over all the other Directors in one particular, and always will have—he is much younger. I can assure you, as far as his capacity is concerned—and I have the pleasure of meeting him on a Committee—he is a most capable, industrious, and intelligent Director.

Mr. WATERLOW: I have much pleasure in seconding the motion. I can only say he is a very able son of his brilliant father.

The resolution was passed unanimously.

Mr. HENRY WOODALL thanked the shareholders for his re-election.

On the motion of Mr. A. BEVIS, seconded by Mr. J. HATCHWELL, Mr. John Allen Stoneham and Mr. Percy Howard Ashworth were re-elected Auditors.

The GOVERNOR: That completes the business of the day, and I thank you for your attendance.

VOTES OF THANKS.

Mr. F. G. PILLEY said the Company had completed a year of working under the shadow of a great war, which war had exhausted the normal condition of things. The Government had felt compelled to impose restrictions and regulations upon trade, and, in addition, they had made very heavy demands upon various concerns, especially the gas companies. These restrictions had meant great expense in the successful working of a huge concern like theirs, and a heavy demand upon the resources of the Company, both active and latent. What they had heard that day fully justified him in saying that, in spite of these restrictions, the Company had come out very well indeed. He thought he should also be right in saying that the demands made upon the Company had been fully met, whether by men for active fighting life or by things asked for to enable the war to be brought to a successful conclusion. How had the result of the last six months been brought about? Simply by the fact that the Company were well organized and able to adapt themselves to new conditions and the demands made upon them; and also to the fact that they had an excellent Governor, a capable Board, backed up by an able staff and able workmen. He had much pleasure in moving that the meeting desired to place on record the deep appreciation of the work of the Governor, the Board, the staff, and the workmen of the Company.

Mr. REGINALD J. N. NEVILLE, M.P., in seconding the motion, associated himself with everything said by the mover of the resolution. With many men at the front it had been extremely difficult to carry on the work; and he hoped that the proprietors would pass a resolution thanking the gallant men who were fighting in the trenches. The Gas Light and Coke Company, which was the premier gas company in the world, was the one which should take the lead in this matter. He should like to have heard how many of their men had received distinctions and commissions, as there must be many who ought not only to be honoured by the proprietors but throughout the whole of England.

The resolution was carried unanimously.

REPLY BY THE GOVERNOR.

The GOVERNOR: On behalf of my colleagues and myself, as well as the officers of the Company, I thank you for the very cordial vote that you have recorded. With regard to the men at the front, we have, as is stated in the report, about 2600 there. Out of this number I am not able to say how many have received distinctions; but I think at least twenty have received commissions, and many have been specially mentioned. I have included in my response the officers (to whom I desire to express also my own personal and cordial thanks); and I hope somebody will propose a resolution thanking those gallant fellows who are doing such valuable work at the front.

THE STAFF AND THE WAR.

Mr. NEVILLE said he should have much pleasure in proposing that the hearty thanks of the proprietors be given to all those who had represented the Company at the front, including the naval and military units, and also the munition workers.

Mr. W. MANN seconded the motion.

The Rt. Hon. Sir DANIEL F. GODDARD, M.P., in supporting the motion, said he thought it most desirable that such a resolution should be passed at the present time.

The resolution was put, and carried unanimously.

The proceedings then terminated.

IMPERIAL CONTINENTAL GAS ASSOCIATION.

Approval by the Proprietors of the Bill in Parliament.

An Extraordinary Meeting of the Proprietors of the Association was held last Wednesday, at the Cannon Street Hotel, E.C.—Sir CHARLES J. JESSEL, Bart., in the chair—for the purpose of considering, and, if thought fit, approving of, the Bill now before Parliament, intituled "A Bill to Remove Doubts as to the Power of the Imperial Continental Gas Association to Sell or Dispose of Portions of their Undertaking, to Confer Various Powers upon the Association, and for Other Purposes."

The SECRETARY (Mr. Robert W. Wilson) read the notice convening the meeting.

The CHAIRMAN said the resolution he had to move was couched in the following terms:

> Resolved that a Bill to remove doubts as to the power of the Imperial Continental Gas Association to sell or dispose of portions of their undertaking, to confer various powers upon the Association, and for other purposes (which has this day been submitted to such of the Proprietors of the Association as were present in person or by proxy at a duly convened extraordinary meeting) be hereby approved, subject to such alteration as may be made in the Bill by Parliament, and approved of by the Directors.

Proceeding, he said the primary cause of the application to Parliament for a new Act was the action of the Board in proposing, and of the proprietors in approving, the distribution of dividends at the meetings of November, 1914, and of May, 1915, without a scheme of profit appropriation as provided by section 120 of the Companies Clauses Consolidation Act, 1845. Going through the Bill, sections 1 and 2 merely referred to the title and the incorporation of the Companies Clauses Acts. Section 3 he would defer dealing with for a moment. Section 4 was the one proposing the confirmation of the distribution of funds as proposed and approved at the meetings referred to. At the last meetings of the proprietors, he fully explained that a technical breach of the law was made, and that they would be obliged to ask Parliament to condone this. This breach of the law was bridged-over by section 4 of the Bill for which approval was now asked. Then when their present powers were under searching examination by their legal advisers, which examination arose from having to submit to

Parliament the question of the technically illegal payment, they were told that certain of their powers were somewhat vague and insufficient. The powers referred to related to the sale of any of their undertakings, and participation with others in similar undertakings. The section principally in question was section 4 of their Act of 1870, which had hitherto seemed sufficient for all their operations in respect of these matters. He might say that, with the approval of the proprietors, the Directors had, since that Act was passed, sold several of the undertakings of the Association. He might instance Cologne, Bordeaux, Amsterdam, and Vienna; and they had also since then acquired large controlling interests in other undertakings—such as the Nancy Gas Company, the Wazemmes Gas Company, and the Compagnie Continentale du Gaz. All such transactions had been duly reported to, and approved of by, the proprietors in general meeting. Now their legal advisers considered that the words of section 4 of the Act of 1870 should be more freely defined, in respect of gas-works, mains, and the business conducted from them, and that amendment should be made which would sufficiently cover the holding of shares in any undertaking similar to their own. It was therefore proposed to make good, by section 3 of the Bill, any deficiency or ambiguity in the powers under which they had acted for forty odd years. [The Chairman read the text of the new clause.] He did not think he need trouble the proprietors with sections 5, 6, 7, and 8. They referred to capital stock and debenture stock—conferring no fresh powers, but modernizing and confirming in more detail those possessed, particularly in regard to redeeming "the whole or any part of such debenture stock, either by paying off the same at the price of £105 for every £100 of such debenture stock on giving not less than six months' notice in writing to the respective holders of debenture stock proposed to be redeemed of their intention to effect such redemption, or by issuing to any holder of such debenture stock, subject to his consent, other debenture stock in substitution therefor." Section 9 made it incumbent upon the Association not to reduce the nominal capital, unless simultaneously with such reduction they redeemed any then outstanding debenture stock to a nominal amount equal to one-fourth part of the nominal amount by which the capital of the Association was reduced. This was quite simple. It meant that, if they paid off £100 of ordinary stock, they must at the same time pay off £25 of debenture stock. Sections 10, 11, and 12 provided for the holding of one general meeting a year, for the payment of an interim dividend, and for the closing of the transfer books preparatory to the declaration of an interim dividend. Sections 13, 14, and 15 dealt with the number of the Directors and their qualification. The present Acts fixed the number of the Directors at ten; but it was now proposed to seek power, while retaining the number of ten as the maximum, to enable the number to be varied to a minimum of five. It would have been economical only the other day (in view of these war times), when they had a much regretted vacancy to fill up, if the Directors had been enabled not to deal with it. But they were bound by statute to fill up the position, and keep the number at ten, which might or might not be advisable under certain circumstances. Then, again, the qualification of the Directors was now £2500 of capital stock. This qualification with the present capital was maintained exactly as it was; but it was provided in the Bill for the qualification to be reduced by £500 for every million of capital which might be paid off. Section 15 contained provisions as to the use of the seal of the Association; and section 16 provided for the payment of the costs of the Act.

There was a little more or less conversational discussion mostly on questions of phraseology in the clauses. Mr. WILFRED C. RUNDLE, Mr. E. P. VACHER, Sir JOHN RUNTZ, and Mr. E. T. A. PHILLIPS took part, and replies were made by the CHAIRMAN and the SOLICITOR (Mr. Charles Wigan). The tenor of the discussion will be gathered by an indication of the replies made.

The CHAIRMAN said he thought that so long as the Association were authorized by English statutes to deal with a foreign body, that was all that was required; and the terms used in the Act "corporation, company, association, body, or person," were comprehensive enough.

The SOLICITOR also considered that section 3 as drafted covered everything. In his view, if they began to particularize too much, it would only lead to confusion.

The CHAIRMAN (replying to Sir John Runtz, who thought it a mistake that there should only be one meeting a year instead of two) said the Association were only putting themselves in line with some of the most important companies in the kingdom. All the railway companies and the banks were now holding only one meeting. He would also point out the inconsistency in their case of half-yearly meetings. They were of considerable inconvenience because the half years were not equal. They could not make the trading of one half year have any relation to the other half year; and it would be much fairer to take year by year. Besides, they were only proposing to follow the custom that was, he believed, absolutely universal abroad, of having only one meeting a year. The German and the French companies with which the Association were connected held only an annual meeting. He might say in this connection (although unfortunately he had not the exact words before him now) that he alluded to this very question some two or three years ago when he first had the honour of occupying the chair, and on that occasion no note of protest was raised by anybody. Therefore, for many reasons, both of expense and convenience, he would urge the proprietors not to in any way mistrust the Directors' proposal of having only one meeting a year. ["Hear, hear" from several proprietors.] As to the suggestion of Mr. Phillips, that after the word "light" in clause 3 of the Bill "heat and power" should be added, he did not see any objection.

The SOLICITOR said he would make a note of the suggestion; and if the Lord Chairman would pass the amendment, it should be done.

The motion was unanimously carried.

Sir JOHN RUNTZ remarked that many of the proprietors would like to know the latest intelligence as to how the works of the Association stood—whether there was anything cheering to help them.

The CHAIRMAN replied that there was nothing fresh to add to what he said last November.

Moved by Sir JOHN RUNTZ, and seconded by Mr. VACHER, a hearty vote of thanks was passed to the Chairman and his colleagues.

TOTTENHAM DISTRICT LIGHT, HEAT, AND POWER COMPANY.

The Half-Yearly Meeting of the Company was held last Saturday, at the Offices, No. 639, High Road, Tottenham—Sir CORBET WOODALL, D.Sc., in the chair.

The SECRETARY (Mr. E. Topley) read the notice calling the meeting; and the Directors' report and the accounts were taken as read.

WAR CONDITIONS—GAS PRICES AND DIVIDENDS.

The CHAIRMAN, in moving the adoption of the report and accounts, said, looking over the series of accounts which formed the history of the Company since the outbreak of war, perhaps the most striking impression one received was that of the steadiness with which the ill-effects accumulated as time passed. There was no going back. The cost of all materials continued to rise with a monotonous frequency; but considering the magnitude of the world war, it was almost surprising that this was not more pronounced. The lighting restrictions became gradually more severe. The pressure of the necessity for domestic economy, and its restrictions in the ordinary consumer's gas account, became more marked as each quarter passed. Reference was made six months ago to the circumstances under which the Directors had advanced the price of gas. A glance at the present accounts would show that the 4d. which they originally proposed, and which, in deference to the wishes of the Tottenham District Council, was reduced to 3d., would not have been adequate to meet all the various advanced charges and expenses; and it was clear that at Midsummer next a further considerable increase would have to be made in the price. The Directors had thought it right again to pay the full statutory dividends out of the undivided profit carried forward, which existed for this precise purpose; and they could congratulate themselves that the remaining accumulated funds of the Company would amply suffice to do the same again in June. But it was evident that it would then be quite time to advance the price of gas to such an amount as would meet the extra war charges, and provide the necessary profit to pay future dividends out of the revenue balance. This necessity further to advance the price, owing to the inadequate advance to which they agreed, was clearly foreseen when they laid their case before the Tottenham Council; but in their (the Council's) judgment consumers would be better able to pay the advance later on. He hoped so.

FINANCIAL QUESTIONS—COAL STOCKS.

The finances of the Company had caused the Directors a considerable amount of thought. Much money had been absorbed by the continued depletion of the amount carried forward as undivided profit, and by the unavoidable capital expenditure, both on the gas and electricity undertakings, and also by some unusual items, as, for instance, the quantity and value of coal stocks, which had risen from £4046 at Dec. 31, 1914, to £36,832 at Dec. 31, 1915—a most necessary increase. He ought, perhaps, to explain that in December, 1914, the stock of coal was so low as to cause considerable anxiety from day to day; and the increase from £4046 to £36,832 meant the absorption of a large amount of the sum available for floating capital. In this connection, it might be noted that coals came in very freely during the summer—partly due to the lighter demand freeing more coals, and partly due to the better working of the railways in the summer weather, with its longer hours of daylight. By the end of October, they had fortunately accumulated 42,000 tons of coal on the works. These stocks were enormous and unprecedented; and they almost feared that they were overdoing their accumulations in this direction. But since then matters had gone entirely the other way; and they were now reduced to 25,000 tons, and were still having to draw upon their coal reserve. The Company's bankers had willingly given assistance in regard to finance, and would continue to do so. The Directors had therefore considered it wiser to avail themselves of this assistance rather than issue fresh capital under the unfavourable conditions at present prevailing. It was better to pay a fairly high rate of interest for a short time than to burden themselves for all time with capital burdened with a heavy rate of dividend. The Directors had also thought it wise to convert the whole holding of the Company in Consols into War Loan on the conditions offered by the Government. The charges involved in the operation, together with the cost—in all £1480—appeared in the net revenue account.

ORDINARY AND COIN METER CONSUMPTION.

He had remarked that the ordinary consumers' accounts continued to show a decrease in average consumption. In each of the eight districts into which, for the purposes of organization, the ordinary consumers of the Company were divided, the average consumption, both of shops and private houses, had decreased since the commencement of the war. On the other hand, coin meters, which now numbered 57,881, against 22,557 ordinary, had steadily increased their consumption; so that, whereas the average consumption by coin meter during the year 1914 was 17,265 cubic feet, during 1915 it was 17,778 feet—an increase of 513 feet per meter, or 2·91 per cent. on the average. In addition, the number of consumers by coin meter had increased as compared with last year by 1422. The general prosperity of the users of this class of meter was also shown by the fact that the replacement of penny meters by shilling ones had been larger during 1915 than in any previous year. It had often been noted here that a large percentage of coin meter consumers changed their residences; and for several years the proportion of such removals per annum was about one-third of the total number. But during 1915 it was only about 20 per cent. A few years ago the number of coin meter installations in empty houses was very large. On Dec. 31, 1910, the number was 4724; but on Dec. 31 last, it was only 641—remarkable evidence of growing, though probably temporary, prosperity due to the influx of workers, chiefly engaged on munitions. The number of meters broken open had again fallen by over 50 per cent. in the year, which was perhaps further evidence of the prosperity of a section of the community. During the year, £120,628 in pennies passed through the coin meters, equal to a total weight of 258 tons, or an average of 5 tons per week.

DETAILS FROM THE ACCOUNTS.

Passing, now, to an examination of the accounts in detail, the capital

account in regard to gas, although increased by £12,309, worked out at £433 per million cubic feet sold per annum—a usefully low figure brought about by liberal depreciations which had been continued during the half year by the writing-off at their customary rates of £8195 from the gas capital. The electrical capital had increased by £2065; but this was mainly due to payments of retention money on the original contrac's falling due during the half year. In the revenue account, it would be seen that materials for gas making had cost more than in the corresponding half year by £22,346; and though about £9000 of this was represented by extra materials used, the balance, which was due to increased price, was considerable. The charge for repair and maintenance appeared high, as compared with the corresponding period of last year; but it was not really so, especially when the price of all materials was taken into consideration, as well as the fact that last year was exceptionally low, and the present year therefore appeared high in comparison. In distribution (particularly repairs and maintenance), they had been able to effect some considerable economies, and others had come of their own accord. For instance, it was their usual practice to lavish attention on the consumers in the matter of maintenance of mantles and other such services; but owing to the war, the Company were so short-handed that they had been compelled to curtail this service. Similarly with gas-stoves and all other appliances, the consumers had mostly been willing to bear their share of the burden, by being content to have done for them only those things which were absolutely essential. The advance in the item of rates and taxes was due to the large increase in income-tax. This item would be more appropriately placed in the net revenue account, and in future it was proposed that it should appear there. The charge for co-partnership was less by £500, owing, of course, to the lower rate of bonus, because of the increase in the price of gas. It was precisely the same as in the case of the proprietors, who had to suffer loss of dividend when the consumer had to pay a higher price. It was hoped that each one would bear his loss with fortitude, and that when better times came he would receive his gain with gratitude. Three items at the bottom of the debit side were all war-items—viz., payments to dependents of men on war service, war bonus on account of charges for increased cost of living, and air-craft insurance. There was more pleasure to be had from contemplating the two first of these, serious as they were, than from any of the other items of expense brought about by reason of the war, which from their nature gave neither pleasure nor satisfaction. During the half year, three more of their employees had lost their lives in the country's cause. They were J. Dickerson, who was killed in action in France, in September; H. T. White, who was killed in action at the Dardanelles in October; and E. Goddard, who succumbed from pneumonia resulting from exposure in the trenches.

GAS RECEIPTS, RENTALS, AND RESIDUALS.

On the credit side of the revenue account, the yield from gas was £16,500 more than last year—partly due to the increased output of 4·89 per cent., which represented about one-third of the increased amount, and the remainder was attributable to the increase in the price of gas. It had been remarked before that the Company's revenue grew more and more dependent on rental of appliances, which again showed an increase of £2500. This must be considered very satisfactory from the fact that no rentals were coming in from the high-pressure and other outside shop lamps, which were perforce idle at the present time, but which in the ordinary course provided a considerable income. With reference to residuals, coke showed a satisfactory increase; but much of this was paid by the Company for the coke used in the manufacture of carburetted water gas. The figure would have been better still if it had not been for several old contracts for coke made at low prices before the rise in value took place. These, fortunately, were now nearly all completed; and this year should show up still better in this item. Tar was disappointing for more than one reason. First, the price was steadily falling, principally because there was little outlet for pitch—the foreign markets having been entirely upset by the war. Secondly, the make per ton was only 8 86 gallons. In the previous half year, the apparent make was exceptionally high; and the suggestion made at the last meeting that this half year must come correspondingly low, turned out to have been a correct prophecy. Sulphate of ammonia presented a good return in ammonia value, which would have been still better if it had not been for forward contracts, and the very high price of acid and lime. On the whole, if they took into consideration the many disturbing elements and factors, the figures must, he thought, be regarded as satisfactory.

WORKING EFFICIENCIES AND LABOUR.

In regard to working efficiencies, these had been reduced as might naturally be expected. As they had one-third of their regular men away fighting, and others had gone to other employment, they were compelled to carry on with new hands who were not used to the work, and who would not be here if they were as young and strong and vigorous as those who had gone. The same shortness of labour and consequent inefficiency existed at the collieries. As a result, the coal which they received, and with which they had to get their results, was in many cases not cleaned as it should be.

ERRATIC METERS AND AN INQUIRY.

Further reference should be made to the unaccounted-for gas, which showed such a serious increase. The causes leading to this were many. They included variations in the date of reading the meter indices; but there was possibly a still more serious fault with the meters themselves. There had been developed in recent years—the last two or three—a considerable failure on the part of meters to register correctly. In a number of cases there had been failure to register altogether. At the instance of the meter makers, who thought the meters were being injured by alterations which had taken place in the manufacture of gas, a Committee had been appointed of representatives of the Institution of Gas Engineers and of the meter makers; and they were making inquiries into the subject, which, he hoped, would result in information of value.

THE ELECTRICITY INDUSTRY.

With regard to electricity, there was not much calling for public notice. The plant he had pleasure in saying had proved entirely satisfactory. It was equal to about six or seven times the quantity of current being sent out; and it would be noted that in the second half year of the establishment of the undertaking, it was paying its way, leaving a small balance to the good.

GAS-WORKS EXTENSIONS AND PROSPECTIVE NEEDS.

With regard to new works, the additional and separate section of gas-works designed for the production of 4½ million cubic feet per day, which was to have been already for work for the present winter, was not completed owing to unavoidable delays, and the work was still making slow progress. This was causing them considerable anxiety. But the Directors hoped that next year the plant would be ready for full use. That the plant should be finished was the more imperative because there was strong probability that the carburetted water-gas plant would not be able to work for lack of the necessary oil for gas making. Gas oil at present was nearly unprocurable; and the price of it was almost prohibitive. Should it become necessary to give up the manufacture of carburetted water gas, the new coal-gas section would be absolutely necessary, and must be brought into full work. This would involve fresh difficulties in procuring the necessary additional coal for making gas by that system, and in the disposal of the resulting coke. These matters were engaging the constant attention of the Directors; and, notwithstanding the many difficulties, they hoped that the important work of the supply of gas to the community and industries the Company served might be successfully continued without any inconvenience or failure.

FREIGHT RATES AND A COMMISSION.

In some observations made in another place the previous day, he called attention to the grave burden imposed on users of coal, and especially upon gas companies, by the enormous charges now made for collier freights. It was high time the Government took strong action in the matter; and he was glad to see that a powerful Commission had been appointed to consider the propriety of taking over the control of the whole British commercial navy, and exercising control over the rates charged. Were it not for this, he should look to the coming year with consternation. With it he trusted, as he had said, that the Company would come through with credit and with satisfaction to the public.

Mr. HENRY BAILEY seconded the motion.

The CHAIRMAN, in reply to questions, said the main cause of the increase in the law costs was a case of a coke contract which, it was alleged, was not carried out properly, and upon which a claim was made. The Directors thought this was altogether unjustifiable, and took it into Court. The case was, with the concurrence of their legal adviser, the subject of appeal; and the Board hoped that the issue would justify their action. As to the dividend, there would be no further decrease at the next meeting; but if, as seemed inevitable, there had to be a further increase in the price of gas, it would carry the sliding-scale diminution of dividend.

The motion was carried unanimously.

THE DIVIDENDS.

The DEPUTY-CHAIRMAN (the Rt. Hon. Sir Daniel F. Goddard, M.P.), proposed the payment of the full statutory dividends at the rates per annum of 7½ per cent. on the "A" stock, 5¾ per cent. on the "B" stock, and 5 per cent. per annum on the preference stock. He remarked that some people might object to receiving dividends which had not been completely earned within the period covered by the accounts; but he hoped to be able to persuade the proprietors on this occasion not to advance any such objection. They had not earned the dividends recommended in the half year for reasons fully explained by the Chairman, but which he did not think in any sense necessitated them withdrawing from receiving their proper dividend. They would have to draw on what he might call their first reserve fund—that was, the balance carried forward, which had been accumulated in past years. And what better could they do with the balance than make up any deficiency in the dividend? He was sorry the dividend had been reduced; but this was a statutory obligation. They had to act differently to most other trading companies, who, when they made larger charges, generally made bigger profits; but in their own case when they made larger charges, they had to divide among the proprietors less profit. This being a statutory obligation, they submitted to it with as much grace as they could command. Of course, the sliding-scale operated both ways. He thought the cherry words of the Chairman with regard to the future were not too optimistic. The proprietors might rely upon that, as the Chairman would not have used the words he did if he had not meant what he said. He (Sir Daniel) believed that the diminution in the balance forward would very shortly be obliterated, and that the balance would again increase as time went on. There was every sign of improvement and progress in their working, which was very hopeful.

Mr. A. W. REID seconded the proposition, and took the opportunity of congratulating Sir Daniel Goddard upon his elevation to the Privy Council.

The proposition was unanimously passed.

VOTES OF THANKS.

Mr. HERBERT MICHELL proposed a very hearty vote of thanks to the Chairman and Directors, the Engineer (Mr. A. E. Broadberry), the Secretary (Mr. E. Topley), their respective staffs, and the workmen, for what they had done during the last six critical and difficult months. The proprietors, he observed, were very thankful to see Sir Corbet that day so very much better than he was two or three years ago. He emphasized the congratulations already offered to Sir Daniel Goddard on his elevation to the Privy Council, and expressed the hope that their Deputy-Chairman would prove one of the wise Privy Councillors. It was a great pleasure to see Mr. Randall present, as through an accident, which fortunately was not serious, he was unable to be at another local function a few days previously. Regarding their men, he understood that something like 220 had joined the Colours from the Company's employ; and the proprietors were glad to learn that only three of the number had during the last six months made the supreme sacrifice of laying down their lives for their country, and for the cause of right throughout the world. He hoped that in some way there would be expression of sympathy sent from the proprietors to the bereaved relatives. They also thought

of those of their men who were fighting under circumstances of extreme hardship, and hoped that they would be spared to, at the conclusion of a glorious and blessed peace, return to the Company. They also sympathized with the Engineer and his staff, and the Secretary and his staff, in the difficult circumstances of the present time.

Mr. MICHAEL WILLIAMS seconded the motion, which was cordially agreed to.

The CHAIRMAN said that once again it was a great pleasure to him to return thanks for the resolution. More that day than ever in the story of the Company, so far as he knew it, was the resolution welcomed and, he ventured to say, deserved. Mr. Michell had referred to the six months as having been critical and difficult. They had been so to a degree that the proprietors could hardly appreciate. There were the difficulties of obtaining materials, and of constant increases in the cost of everything the Company had to buy. There was the difficulty of obtaining workmen to do the necessary work, and, when they were obtained, to teach them how to do the work, because those who were absent were acquainted with their operations, while those who came fresh to them had to be trained. The Deputy-Chairman, who was a member of Parliament and a Privy Councillor, and therefore one who knew most things that were going on, spoke of the probable short time before the war was over, and they began again to fill up their reserve, and all things would go merrily and happily. He (Sir Corbet) wished that he could at the present time feel and say that this would happen in a short time. However, the Company were in a position as favourable as he thought most companies were of which he knew to face another year of war conditions; and he sincerely hoped that at the end of it they might be in the condition that Sir Daniel forcasted. At any rate, the effort which the proprietors had acknowledged had been put forth by the Directors, the officers, and the workmen during the past six months, he was sure would not be withheld in the time to come; and, so far as possible, they would do all they could to keep up to the full the measure of good repute the Company had held in the past.

Mr. BROADBERRY (responding for Mr. Topley and himself, and their staffs) heartily thanked the proprietors for their recognition of their services. He remarked that they could fairly claim that they had done their level-best in their various spheres to make the business of the Company go as well as possible. He believed the staff, from top to bottom, felt that, in the present strenuous times, it was their duty, not only as servants of the Company, but as citizens, to do everything in their power to "carry-on" until better times came, and the proprietors might rely on them continuing to act in this way.

Ambulance Work.

The CHAIRMAN said that the Company's employees who were members of the St. John Ambulance Class had been working during the autumn and winter under the direction of Dr. M'Laren; and they were entitled to certain distinctions and awards, which were now to be conferred. Those of the proprietors who cared to honour the men by remaining could do so; but otherwise the business was concluded. [The proprietors all remained.] Proceeding, the Chairman said twenty-four of the men had attended the class; and he was proud to say that out of this number only three failed to pass. Even this was due to other important work which interfered with the regular attendance of the three at the class. [The certificates, medallions, and labels were then distributed.] Afterwards, the Chairman remarked that the large number of passes out of the total number was a great credit to the instructor. Dr. M'Laren received no fee for the work that he had done. But there was a feeling that this was an oversight, and ought not to be tolerated. He hoped that in some way this would be made good. At any rate, they were under an obligation to him for the work he had undertaken, and had done so successfully. He also wished to thank Captain Powell for the encouragement he had given to the men.

Captain POWELL, at the request of the Chairman, gave the proprietors some account of the work that was being done in the district; and, in the course of it, he acknowledged the great assistance rendered by the Company to him and those working with him in dealing with the conveyance of wounded soldiers to the hospital—particularly in the earlier stages of the war.

Regulating Coal Distribution.

Owing to the increasing demands of industries connected with the war, the difficulties with regard to fuel supplies, to which the Board of Trade called attention on Dec. 1 last, have become more pressing in certain districts. It was decided, therefore, to appoint, on the nomination of the various coalowners' associations, District Coal and Coke Supplies Committees, with the object of ensuring that munition firms and other important consumers obtain the supplies they need with as little delay and friction as possible. The question whether licences for the export of coal and coke can be issued will necessarily depend largely on the home demand being satisfactorily supplied. Committees have been formed, or are in course of formation, in various districts; and it will be the business of these Committees to see that the resources of their districts are utilized to the best advantage, and that the requirements of important industries are fully met. Any recommendations that they may be able to make with a view to greater economy in the use of coal will be carefully considered. It is not proposed to confer any special powers on the Committees. It is felt that both coalowners and consumers realize that the industries connected with the war must have precedence, and that some interference with the normal distribution of coal at the present time cannot altogether be avoided. Mr. Runciman has appointed a Committee to consider all questions relating to the distribution of coal and coke that may be referred to them from time to time by the Board of Trade or submitted by the District Coal and Coke Supplies Committees.

Professor Harold B. Dixon, M.A., Ph.D., F.R.S., of Manchester, has (according to the printed minutes of the Salford Corporation Gas Committee passed at last Wednesday's meeting of the Town Council) been appointed Gas Examiner for testing the gas supplied by Salford to consumers in the districts of Eccles, Swinton, and Pendlebury, for 1916, in accordance with the Salford Corporation Act, 1897.

NEWCASTLE AND GATESHEAD GAS COMPANY.

The annual meeting of shareholders in the Newcastle-upon-Tyne and Gateshead Gas Company is to be held next Tuesday, when the Directors will report that the revenue for the year ended Dec. 31 was £579,481, and the expenditure £454,937. With the amount brought forward, there is a total available balance of £131,123, which the Directors recommend should be appropriated as follows: Interest on debenture stock and loans, £29,968; interim dividends on the preference stock at the rate of 4 per cent. per annum, and on the ordinary stock at the rate of 4¼ per cent. per annum, £44,866; final dividends at the same rates, £44,866—leaving to be carried forward £11,423.

The Directors go on to say that the quantity of gas sold during the year was 3,796,345,000 cubic feet—an increase over 1914 of 265,247,000 cubic feet, or 7·51 per cent. The revenue from gas was £367,378, compared with £322,302 in 1914; from residuals £151,556, against £127,435 in the previous year. The numbers of consumers, and apparatus out on hire, at Dec. 31 were: Consumers, 124,527 (increase 1404); cooking-stoves, 75,002 (increase 940); grillers, 10,406 (increase 254); gas-fires, 13,062 (increase 1041). The reconstruction of the carbonizing plant at the Elswick station has been completed; and the whole of the new plant is now in operation. Additional purifying plant at Elswick and oil-gas plant at Redheugh are in course of erection. Owing to delays arising from the war conditions, these were not completed in time to be in operation at the commencement of the winter season.

Having regard to the altered value of money brought about by the war, the Directors deemed it necessary to deposit a Bill in Parliament with the principal object of removing the restrictions which at present exist upon the Company's financial powers, and of increasing these powers so as to enable the Company when necessary to raise money on the best terms obtainable. The Bill will be submitted to the proprietors at an extraordinary general meeting, which will follow the ordinary meeting.

BRENTFORD GAS COMPANY.

Half-Yearly Report and Accounts.

In the report which will be submitted at the half-yearly meeting of the Company on Friday, the Directors state that the accounts for the six months ended Dec. 31 show a profit on revenue account of £49,829. After providing for fixed charges, and writing-down investments, there remains a sum of £39,456, which with the balance brought forward makes an amount of £106,581 available for dividends. The Directors recommend dividends, subject to income-tax, at the rate of 5 per cent. per annum on the preference stock, at the rate of £5 12s. per cent. per annum on the "A" consolidated stock, and at the rate of 5¼ per cent. per annum on the "B" consolidated stock. As compared with the corresponding half year, the gas sold shows an increase of 4·43 per cent. The total number of consumers is 117,357 (including 6215 for Staines and Sunbury, not included last year), as against 108,978 last year. The Directors have been compelled, in consequence of the increased cost of coal and oil, to raise the price of gas, from Christmas last, from 2s. 4d. to 2s. 6d. per 1000 cubic feet. This increase will involve a small reduction of dividend to the shareholders. The Directors propose that in future there shall be only one general meeting of the proprietors each year—in the month of February—instead of half yearly, as heretofore.

The accounts accompanying the report show that the revenue from the sale of gas amounted to £222,684; from the rental of meters, stoves, and fittings, to £42,775; and from the sale of residual products, to £63,795—the total receipts being £329,324. The expenditure on the manufacture of gas was £198,797; on distribution, £37,895; on management, £9716; on rent, rates, and taxes, £15,164—the total expenses being £279,495. The balance carried to the profit and loss account is £49,829.

The working statements indicate that 99,290 tons of coal and 1,785,424 gallons of oil were used in the past half year in the production of 2,071,735,000 cubic feet of gas (including 857,508,000 cubic feet of carburetted water gas), of which 1,885,501,000 cubic feet were sold and 1,916,662,000 cubic feet were accounted for. The estimated production of residuals was: Coke, 61,983 tons; breeze, 9073 tons; tar, 1,338,442 gallons; ammoniacal liquor, 29,642 butts.

SOUTH SUBURBAN GAS COMPANY.

Half-Yearly Report and Accounts.

The following is the report of the Directors of the Company—signed by Mr. Charles Hunt, as Chairman—for the half year ended Dec. 31. It will be presented at the ordinary general meeting next Friday.

The net revenue account shows that, including the balance of £5073 brought forward from last half year, and after providing for debenture and other interest, the amount available for dividend is £34,109, out of which the Directors recommend the payment of statutory dividends (less income-tax) as follows: On the 5 per cent. preference stock, 5 per cent. per annum; on the 5 per cent. ordinary stock, £4 16s. 8d. per cent. per annum; on the 5 per cent. West Kent ordinary stock, £4 16s. 8d. per cent. per annum—leaving to be carried forward to the next half year £6320.

The sales of gas show an increase of 1·01 per cent., as compared with those for the corresponding half of the previous year. The number of consumers has increased in the half year by 1210, and of cookers, gas-fires, &c., in use, by 3393.

Coal deliveries have been well maintained throughout the winter; but the unexpected continuance of excessive freight charges is causing much anxiety.

There has been an excellent demand for coke, though its delivery to consumers has been seriously interfered with by congestion of railway

traffic, and scarcity of conveyances for road transport. Sulphate of ammonia has also been readily sold at advancing prices.

Conversion of the Company's investments in Consols into War Loan Stock has been effected at market prices. Other investments have also been written-down, so that the amounts now standing to the credit of the reserve and special purposes funds respectively represent as nearly as practicable current values.

The number of the Company's employees who had joined the Colours by the end of the year was 250; and at that date every medically fit member of the staff of military age had either so joined or been attested for service.

The Directors who retire by rotation at this meeting are Mr. Charles Hunt and Mr. Charles Carpenter, D.Sc., both of whom being eligible offer themselves for re-election. One Auditor, Mr. Samuel Wood, F.C.A., also retires by rotation, and being eligible offers himself for re-election. Mr. George Ross, the retiring Employee-Director, has been re-elected without opposition.

The accounts accompanying the report show that the total capital expenditure at the close of the half year (including the nominal amount added by conversion) was £1,399,135 3s. 11d., or £12,430 3s. 11d. more than the receipts—viz., £1,386,705, inclusive of the premium capital. A sum of £1226 9s. 8d. was expended on capital account in the half year. The revenue from the sale of gas was £156,955; the rental of meters, stoves, and fittings produced £18,692; the sale of residuals, £57,888; and the total receipts were £233,964. The following were the principal items of expenditure: Gas manufacture, £129,798; distribution, £43,575; management, £8464; rents, rates, and taxes, £7656; and miscellaneous items bringing up the total to £198,854. Among the items is one of £1000 charged on account of the co-partnership scheme. The balance carried to the net revenue account is £35,109; and the amount available for dividend is £34,109.

The statements as to working show that, under the supervision of Mr. S. Y. Shoubridge, the Engineer, 71,204 tons of coal were carbonized and 590,907 gallons of oil used in the half year. The quantity of gas made was 1,149,041,000 cubic feet (252,423,000 cubic feet of oil gas), of which 1,027,769,800 cubic feet were sold and 1,037,962,000 cubic feet were accounted for. The residuals made were: Coke, 46,276 tons; breeze, 15,922 yards; tar, 747,903 gallons—the make of sulphate of ammonia being 798 tons.

EDINBURGH AND LEITH GAS COMMISSIONERS.

Additional War Bonuses—Sale of Gas.

The Edinburgh and Leith Gas Commissioners have again had under consideration the question of the workmen's wages; the subject having been raised by the Edinburgh Branch of the National Union of Corporation Workers. The Commissioners met a deputation from the Union on Dec. 13; and on Jan. 3 the Consulting Engineer (Mr. W. R. Herring) and the Resident Engineer (Mr. Alexander Masterton) issued a joint report, in which they reviewed the duties and wages of the men, and came to the general conclusion that they were being amply paid for their services. "If, however," they remarked, "the Commissioners consider that the plea of increased cost of living now put forward—although given effect to in the war bonus granted in April last—is justified, we feel that an adjustment on this scale is the proper means by which a temporary advance in the cost of living should be met." They suggested the following additional bonus for permanent workmen in the manufacturing and distribution departments, excluding men on war service and tradesmen receiving the recognized trade rates or their equivalents:

Wages.	Additional Bonus.	Total Bonus.
20s. to 30s. per week	2s. 0d. ..	4s. 6d.
Above 30s., but not exceeding 35s. . .	1 6 ..	3 6
Above 35s., ,, ,, 40s. . .	1 0 ..	3 0

As regards meter-readers, they were of opinion that the present minimum of 24s. per week should remain, but that the present maximum of 35s. should be raised to 40s., or, alternatively, a war bonus of 3s. 6d. per week. They further advised the giving of an all-round bonus of 3s. per week to the permament members of the clerical and administrative staffs whose wages amounted to 40s. and under; those with wages over 40s. and under 43s. to have the difference made up. They estimated the annual cost of the suggested bonus at £2143.

The Commissioners decided unanimously not to alter wages in any case, but to grant, as from Nov. 15 last, the additional war bonuses recommended by the Engineers. It was further agreed that the bonus scale applicable to the clerical and administrative staffs in the Engineer's department should also apply to the Treasurer's clerical and collecting staff.

A letter from the Town Clerk of Edinburgh, with reference to the proposed experimental installation of apparatus for the automatic lighting and extinguishing of public lamps, was remitted to the Works Committee.

The Treasurer (Mr. A. Canning Williams) reported that the total quantity of gas sold during the summer and autumn term (six months) was 753,106,000 cubic feet—a decrease of 2·41 per cent. on the corresponding period of 1914. The gas consumed by the public lamps amounted to only 873,000 cubic feet, against 30,163,800 feet in the same period of the previous year—a fact which more than accounted for the decrease in the total sale.

The Spenborough District Council recently decided to increase the salary of the Gas Manager (Mr. A. E. Jennings) from £200 to £250. The increase was opposed by the Labour party in the Council; but it was shown that the increase was a fulfilment of an implied undertaking given at the time Mr. Jennings was appointed, and several members held that some injustice had already been done to him by undue delay.

SOUTH METROPOLITAN COMPANY'S CHIEF ENGINEER.

Mr. Gill's Message in the "Co-Partnership Journal."

The following words of greeting to the employees, by Mr. G. M. Gill, the newly-appointed Chief Engineer, appear in the February issue of the South Metropolitan Gas Company's "Co-Partnership Journal."

Being a newcomer to the Company, I have been asked by the Editor to write something for the "Co-Partnership Journal;" and it is a request to which I acceded quite readily, but, I fear, without considering whether I could write anything which would be of interest to you. I may say at once that I am very proud indeed to be a member of the South Metropolitan Gas Company. Its great traditions have been for years the admiration of the whole gas industry; and this should be a source of pride to all those who form the links of this very substantial chain. Its pioneering work in strengthening the foundation on which the industry stands, and its timely and skilful investigations into matters which so urgently needed attention, have earned for the Company a great reputation among not only the gas industry, but a huge public outside. Therefore, I have every reason to be proud of being accepted into your ranks.

I have for years had experience of co-partnership in the Company which I have just left, and have always been an admirer of its advantages, which are so substantial and so obvious that it should only be a question of time before the whole industrial world is governed on similar principles. Here, again, our great Company was a pioneer in the face of immense difficulties.

The limited time—a few weeks only—during which I have been in the service of the Company is altogether too short for me to be able to make any observations upon any particular points which have already impressed themselves upon my mind; but at this early stage I can say that if those I have already met of the employees of the Company are representative of the whole body, I am indeed pleased at the prospect of working among you. I am deeply anxious to work in harmony with both staff and workmen, and equally anxious to act fairly to all. It will not be out of place to state here that, so far as I am concerned, only merit will count when promotions are being considered. I am, and always have been, partial to the keen and hard worker, who studies his Company's interests before his own. This is in no case a hardship; for in studying his employers' interests he is looking after his own in the most effective manner. I am a believer in the value of athletics and games, partly for the healthy exercise which they give the body, and partly for the sportsmanlike spirit which they help to develop. This spirit is a great asset in dealing with our fellow-men, in whatever rank of life they may happen to be. By a sportsmanlike spirit I mean a spirit which considers impartially the other man's point of view; that takes no unfair advantage of a superior position; and that makes a man act in a straightforward manner, apart altogether from personal considerations.

In conclusion, I will take this opportunity of wishing all co-partners a "Happy New Year," in the course of which we all earnestly trust that a victorious peace will ensue.

COLCHESTER GAS BILL.

The Gas Company's Proposals Discussed.

The report of the Special Committee appointed to consider what steps should be taken regarding the Gas Company's Bill was presented at the meeting of the Colchester Town Council last Wednesday.

The Committee stated that Messrs. Baker and Sons (Parliamentary Agents), who had acted for the Corporation on former occasions, had reported that the Colchester Gas Company had not been to Parliament since 1875, and had now deposited a Bill very largely to increase their powers. It was therefore necessary that the application of the Company should be closely scrutinized, and care taken that the powers granted them should not enable them to stay away from Parliament for another forty years. The Committee pointed out that the Company's capital had all been raised and spent, that their borrowing powers were exhausted, and that they were overspent by upwards of £2600. The Company were limited to maximum dividends of 10 per cent. on the original capital and 7 per cent. on the capital issued under their 1875 Act; and the profit revenue for the last year was in excess of what was required for the payment of these dividends. A considerable sum had also been obtained by the Company by way of premiums which carry no dividends; and there was also £13,000 carried forward in excess of the Company's statutory powers, which would be included in the purchase, subject to the amount of the next half-year's dividends, £2050. The Committee were of opinion that the Company had committed other statutory irregularities, which would have to be looked into. Having regard to the fact that war was pending, provision had been inserted in the recent case of Skegness that the undertaking should vest in the Corporation on or about the date of the award, but the purchase price need not be paid until after the war. In the meantime, the Company were to be paid interest on the amount of the award, and the profits to go to the Corporation. In the case of Chelmsford, which was now acquiring (after opposition) the undertaking there, payment is deferred until the Corporation can borrow the money after the war—they paying 5 per cent. in the meanwhile.

From the clauses of the Bill, it appears that some portions of the existing gas-works have been erected on lands which are not authorized to be used for gas manufacturing purposes, and the Bill seeks to rectify this. It also seeks to authorize the Company to acquire more land for the extension of their works, and to construct other works, which will cause some interference with roads. The Bill proposes to extend the limits of supply so as to take in all surrounding parishes as far as Great Bromley on the east, Copford on the west, Langenhoo on the south, and Boxted on the north; and it will be known that already the Company have laid some mains for supplying gas outside

the borough without any statutory authority. The effect of such a great enlargement of limits would be to enable the Company to spend in the outlying area revenue earned in Colchester, and, should the extensions of mains into that area not prove advantageous, the profits of the entire undertaking might be seriously decreased, and the price of gas might even have to be increased instead of being reduced. Under the Company's existing Acts it is incumbent upon them to supply gas of an illuminating quality of 16 candles, and the test prescribed for the quality is that of illuminating power. The Company seek, however, to substitute for this gas of much inferior quality, which might not be equal to more than 11 or 12 candles; and they desire to test for heat instead of illuminating power. It might be that the calorific test could not be successfully objected to, as it had been inserted in recent Acts; but it should be pointed out that the reduction in the quality of gas would represent an additional profit to the Company of about 1½d. for every 2 candles, and, as the apparent reduction would be from 16 to 12 candles, they would get an increased profit of 3d.

On the point of pressure, the Committee were advised that an alteration should be made in clause 25. In the case of the Isle of Thanet Gas Bill, 1914, the 8-10ths of an inch of water (as mentioned in the Model Clauses and in the Company's present Bill) was increased to 2 inches. On the question of capital, the Company propose an increase of £125,500, which would be more than double their present capital; and the amount, if allowed, would probably last them for fifty years, during which period the Corporation would not have a like opportunity of purchasing the undertaking, or obtaining any concessions. After referring to the sliding-scale proposals, the Committee urged the Council to ask for the insertion of the optional purchase clause, and therefore lodge a petition opposing the Bill.

Mr. Wallace, speaking in favour of the adoption of the report, said that to support the petition in Parliament and oppose the Bill would cost from £200 to £300. Before, however, such a position was arrived at, they hoped to meet the Directors of the Company in a friendly spirit, and to agree on many points so as to lessen costs. He could not help thinking that, after full consideration, the Directors and shareholders would see that it was in the best interests of all concerned to come to an agreement. The Colchester Water-Works, which were acquired in 1879, had contributed to the district fund in relief of the rates a sum of £39,345.

A Special Committee of the Bradford Corporation appointed to consider applications by employees for increases in war bonus, or the abolition of bonus and increase of wages, have decided to recommend that it is desirable to maintain the principle of adjustment of wages during the war by bonuses rather than wage revision, and that the bonuses be revised on the following basis: Men over 19 years of age, an increase of 3s. per week where wages do not exceed £3, the increase not to make the wage higher than £3; male employees under 19, 2s.; female employees, 2s. per week all round, the maximum the same.

STOCKPORT GAS-WORKERS' ARBITRATION.

Further Advances in Wages.

At the Monthly Meeting of the Stockport Town Council last Wednesday, the minutes of the Gas Committee were submitted for approval. They showed that further questions had arisen out of the terms of settlement reported in the "JOURNAL" for Jan. 11 [p. 99.].

Mr. S. Meunier (the Gas Engineer) reported that on Dec. 31 a number of men in the carbonizing department threatened to leave work, and actually did put down their tools and go into the mess-room; but after an interview with the Chairman (Mr. J. Winter, J.P.) and himself, they had resumed work. The Committee decided to request the General Secretary of the Municipal Employees Association to attend their next meeting. At a meeting the week following, the Secretary attended, and put forward a number of claims on behalf of the workers. A deputation from the employees also attended, in support of an application for an advance in the wages of the gas stokers. It was decided to advance the stokers' wages from 5s. 9d. to 6s. 1d. per shift. The consideration of other employees' wages was deferred to another meeting. Carters' wages were advanced to 29s. per week.

THE EXPLOSION AT A BLACKBURN GAS-WORKS.

Gas-Workers' Representative's "Challenge."

The members of the Blackburn Town Council had another long and stormy sitting on Thursday evening; and towards the end of the proceedings reference was made to the recent explosion at the Addison Street Gas-Works, caused by the safety doors of the water-gas plant being tied down. At the last meeting of the Council, Mr. E. Porter, the local representative of the National Union of Gas Workers and General Labourers, sought to have an inquiry made into the cause of the explosion by a representative Sub-Committee [*ante*, p. 100]; but this was negatived. Mr. Porter stated at this meeting that he knew the name of the man who had caused the explosion; that the explosion was not caused deliberately or maliciously; but that he demurred to giving the employee's name without certain safeguards. In a letter to Mr. J. R. Clynes, M.P. (the General Secretary of the men's Union), Mr. A. Morton Fyffe (the Gas Manager) recounted the facts, and stated that the Gas Committee had placed the matter in the hands of the Chief Constable of Blackburn for investigation.

The reference to the explosion arose out of a side-issue which had no connection with gas engineering matters at all. Mr. Porter introduced a subject, of which he was understood to say he had given previous notice, regarding the dismissal of a meter inspector of 28 years' service. The speaker alleged that the man had been dismissed because he was

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said to have made a statement to a third party which reflected upon Mr. Fyffe. The meter inspector referred to had requested that he should be confronted with the person who had made the allegation, but this had not been granted. The Gas Engineer had, he said, constituted himself prosecutor, jury, and judge in the case. Meter inspectors visited thousands of houses in a quarter, and in many they were liable to be drawn into a conversation on gas matters. If everyone was to be allowed to report any unfortunate statement a man might make, the lives of the employees would be intolerable.

Mr. J. W. Holgate (the Vice-Chairman of the Gas Committee) said that Alderman Nuttall (the Chairman) and himself went very carefully into the facts of the case, and communicated their finding to the Gas Committee. All the members of the Committee, except Mr. Porter, agreed with the action that had been taken. They did not think it necessary to see the employee; for, having confidence in Mr. Fyffe, they knew he would deal impartially with him and any man at the works. Mr. Fyffe intended that the works should be carried on on businesslike lines ; and he urged the Council, by rejecting the resolution, to indicate the confidence they had in their Manager.

Other speeches followed in like strain ; Mr. Dean remarking that Mr. Porter had said it was unfair the name of the person who had made an allegation against the meter inspector should be withheld. He would remind Mr. Porter that at the last Council meeting he was asked to state the name of the man who had caused the explosion at the gas-works ; but he refused to do so. If it was unfair to give the name then, it would be equally so now. When the Chairman and Vice-Chairman of the Gas Committee, who were unbiassed, and had no desire to injure a workman, told them they had fully investigated the case, and approved of what had been done, they could safely leave the matter in their hands.

Mr. Porter said he insisted on the matter going to a vote. He denied that the workman referred to had had a proper hearing. An inquiry ought to be held ; and if it was then found that the Manager was correct, then nothing would have been lost. He was perfectly prepared to accept Mr. Dean's challenge. If the Mayor (Alderman Nuttall) would produce the persons who reported the meter inspector, he would produce the man who was responsible for the gas explosion. He accused those responsible for the gas management of taking advantage of the fact that the gas workers had promised not to strike during the war, and contended that unrest would prevail so long as they stuck to present methods.

By 35 votes to 5, the resolution was lost.

Price of Gas at Barry.—The question of the advisability of increasing the price of gas was raised at a meeting last week of the Barry Gas and Water Committee. It was stated that the only alternative to such an increase would be an addition to the rates in the future. It was, however, agreed that the price of gas should remain as at the present time.

GLASS TRADE IN THE MIDLANDS.

Manufacturing Lighting Ware.

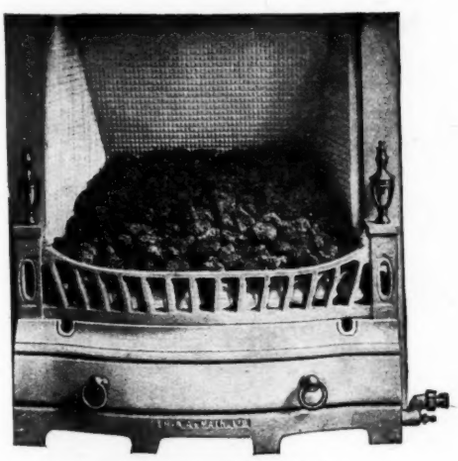
In connection with the recommendations favouring "reasonable import duties," which are contained in the report published last Thursday of the Sub-Committee of the Advisory Committee to the Board of Trade on Commercial Intelligence, the "Birmingham Post" on Friday made the following remarks on the glass trade—one of the industries to which inquiries were directed by the Committee.

Manufacturers in the table and lighting glass trade are of opinion that only total prohibition of German and Austrian imports for three or five years, and a substantial tariff afterwards, can secure the British market for the home manufacturer. In lighting glass particularly, Germany and Austria have done an enormous trade in recent years, largely in consequence of the cheap production which follows from the employment of child labour and the dumping of surplus products here at a ruinously low price ; while in their own protected market very much higher values obtain. Cheap railway and canal freights also have assisted them materially. At a meeting of the trade the other day, it was responsibly stated that a case of Silesian glass could be delivered in Birmingham at a rate no higher than that charged by our own railway for the transport of a similar case from Birmingham to Wolverhampton. It cost twice as much to send a case of glass to the Continent as to send a similar quantity from Silesia or Bohemia to this country.

British manufacturers of flint glass are to day producing enormous quantities of lighting and table glass ; but their prices are from 100 per cent. to 400 per cent. higher than those charged for imported glass before the war. Speaking on this question yesterday, a member of a Midland glass firm said the prohibition and tariff would give the local manufacturer time to pull his trade together and confidence to embark new capital on premises and plant, and to develop new processes. The war, by cutting off supplies of certain materials and restricting labour, had done a good deal for them ; and they were able to produce more economically in several directions to-day. More important, however, was the fact that now factors were giving them orders for ten thousands where formerly they had difficulty in securing orders for hundreds ; and prohibition or a tariff would perpetuate this advantage. If this tendency continued, manufacturers would feel themselves justified in remodelling their works and making moulds which the smallness and variety of the orders at present prohibited. The public, he admitted, were paying very high prices for all kinds of glass to-day ; but there need be no fear that these prices would continue if the British glassmakers were given an opportunity enormously to increase their outputs, as they would if there were a reasonable measure of protection against dumped glass.

Before the war Germany supplied the great bulk of the glass for electric glow lamps manufactured in this country. Late in 1914 the

THE MAIN GAS FIRES.



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British manufacturer commenced the production of these bulbs, and has supplied increasing quantities to the lamp manufacturer. The price has, however, varied from 100 to 200 per cent. in excess of that charged for the imported bulbs, as manufacturers had had no previous experience of the trade. Materials and labour were high in cost, and staffs had to be trained. Manufacturers, however, hold out small hope of being able to produce at the prices of the imported glass for a long time to come; but were the trade given an opportunity to establish itself, and an enormous consumption assured to it, it is believed the margin might be much reduced. Unless substantial protection is given to the trade, it will be lost to this country immediately Continental countries are allowed to export. This is the statement of a member of a Midland firm of flint-glass makers who has undertaken the production of electric bulbs. A small tariff of only 5 per cent. is advocated on glass bottles. Manufacturers recognize that, owing to the difficulty of training workmen, and the provision of new plants, it must be a long time before they could produce anything like the bulk required in this country. A Birmingham manufacturer expressed doubt as to whether a 5 per cent. tariff would be sufficient to induce makers largely to increase their output and train staffs.

NOTES FROM SCOTLAND.

"Scottish Gas Industry" Motor Ambulance.—Mr. Alexander Masterton, the Engineer and Manager of the Edinburgh and Leith Gas Commissioners, in his capacity of President of the North British Association of Gas Managers, performed an interesting little ceremony at Glasgow on Wednesday last [see p. 301], when, in the presence of a large attendance of representatives of the principal Scottish gas undertakings, he handed over to the Scottish Branch of the British Red Cross Society a fully-equipped motor ambulance. Mr. Masterton stated that an appeal for subscriptions had been made to gas undertakings, managers, and employees in Scotland, and that over £400 had been raised. In accepting the gift, the Hon. Treasurer of the Scottish Branch of the Society said that they now had 174 motor ambulances in use at the front, and all were manned by Scotsmen.

Breakdown at Perth Gas-Works.—The Gas Committee of the Perth Town Council had before them last Tuesday the report which had been prepared by Mr. John Lambert, the Burgh Electrical Engineer, at the request of the Emergency Committee appointed a few weeks ago, consequent upon the recent breakdown at the gas-works. The report had previously been considered by the Emergency Committee, and submitted by them to the principal Committee, with the recommendation that the work suggested should be carried out, and a remit made to the Emergency Sub-Committee to see this done. The report contained some very pointed references to the condition of the electric stoking plant at the works; it being suggested that it had apparently been constructed with the expectation that there would never be any breakdown or renewals required. The arrangement of the machines was such that to effect renewals meant a considerable waste of time. One point on which stress was laid by Mr. Lambert was that the vital parts of the machinery seemed to be the most inaccessible for repairs or renewals. He recommended that spare armatures should be provided for all the machines, and said that with the alterations suggested by him it should be possible to effect a renewal in a much more limited space of time than is required at present. The condition of the power-house at the works also came in for severe criticism. It was, he said, damp, and unsuited for the plant, which seemed to be in such a condition as to demand immediate attention. Mr. Lambert made some other recommendations. In the discussion on the report, it looked on occasion as if friction was to arise between the supporters of the electric stoking plant and the members who opposed its introduction to the gas-works. In the end, however, the recommendation of the Emergency Committee was approved; and it was remitted to them to carry into effect the suggestions made by Mr. Lambert.

Glasgow Private Street Lighting Charges.—A meeting of the Glasgow Corporation Committee on Objections to Assessments was held a few days ago, to consider appeals by certain houseowners in various parts of the city against being charged the usual rate of 15s. per lamp per annum for the lighting of private streets and courts. [See "JOURNAL," Dec. 7, p. 549.] The appeal was on the ground that many of the lamps at present are unlit. In view of the darkening of the streets being a temporary expedient arising out of the exigencies of the war, a Committee, at a meeting in November, held over the appeals, on the understanding that the Corporation would refund the money if the appeals were sustained. At last week's meeting, it was pointed out by the appellants that the circumstances were unchanged. Treasurer M'Millan (who presided) said the Committee had very carefully considered the appeals. While the lights that had been put out were extinguished on the instructions of the military authorities, the Committee, according to the wording of the Act, had no other course open to them but to sustain the appeals for the period during which the lamps were unlit. The question arose as to whether this decision should apply only to owners who had appealed; but the Court thought it fair the concession should be made to all who were similarly affected.

Perth Gas-Workers Wages.—The dispute which has been pending for some time between the Corporation of Perth and the employees at the gas-works has reached an interesting stage. After a debate at the last meeting of the Town Council, it was resolved to invoke the aid of the Board of Trade in the matter; and on Monday of last week the Town Clerk received a letter intimating that Sheriff Mackenzie (of Inverness) had been appointed as Arbitrator in the dispute. The question of the gas-workers' remuneration has been hanging fire for a considerable time. Shortly after the outbreak of war the Council passed a resolution by which it was agreed that no increase of salary or wages should be given during the course of hostilities. The employees at the gas-works, as well as other men in municipal service, made a request for an advance of wages, and while other fellow servants in different grades of service were content with a refusal of their application, the

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gas-workers persisted in their demand for a rise of 1d. per hour. A firm attitude was adopted by the councillors; and the men then placed their case in the hands of the Gas-Workers' Union. An official from this body was received by the Gas Committee; and he made a request for the men to be paid trade union rate of wages. This led Lord Provost Scott and other members of the Council to hint that, if the men persisted in being paid at trade union terms, the Municipality might be compelled to withdraw their scheme of pensions to old and retired servants, and other privileges enjoyed by the men.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Feb.* 7.

As anticipated a short time ago, rates of freight on pitch to the French Mediterranean ports have fallen substantially, but still are at a very high figure. Makers still quote 19s. to 19s. 6d. per ton net at works for pitch—with little business doing. The value of 90-160 solvent naphtha is 2s. 2d. to 2s. 3d. net per gallon in bulk at makers' works; while considerable business is reported in creosote at over 4½d. per gallon net in bulk.

A good trade with home farmers is being done at the special price arranged by the Sulphate of Ammonia Association. For export the value is unchanged at £17 5s. net per ton, filled into buyers' bags at makers' works, for 25 per cent. quality.

Tar Products in the Provinces.

Feb. 7.

There is nothing fresh to report concerning the markets for tar products. Pitch is still very quiet and difficult to sell. Creosote is weak, and no prices are reported to have been accepted. Solvent and heavy naphthas are in good demand.

The average values of gas-works products during the past week were: Gas-works coal tar, 18s. 3d. to 22s. 3d. Pitch, East Coast, 15s. to 16s. per ton; West Coast, 14s. to 14s. 6d. Manchester; 15s. to 15s. 6d. Liverpool; 17s. to 17s. 6d. Clyde. Benzol, 90 per cent., North, 10½d. to 11½d.; 50-90 per cent., naked, North, 1s. 3d. to 1s. 4d. Toluol, naked, North, 2s. 3d. Coal tar crude naphtha, in bulk, North, 6½d. to 7d. Solvent naphtha, naked, North, 2s. 1d. to 2s. 2d. Heavy naphtha, naked, North, 1s. 2d. to 1s. 3d. Creosote, in bulk, North, 2⅝d. to 2¾d. Heavy oils, in bulk, 3⅝d. to 4d. Carbolic acid, 60 per cent., East and West Coasts, 3s. 4d. naked. Naphthalene, £18 to £28; salts, 80s., bags included. Anthracene, "A" quality, 2d. to 2½d. per unit; "B" quality, nominally ⅜d.

Sulphate of Ammonia in the Provinces.

LIVERPOOL, *Feb.* 5.

Throughout the week the market for this material has remained idle, as it has been impossible to do business for shipment to foreign countries, and the demand for home requirements has only been on a limited scale. The nominal values for export are £17 2s. 6d. to £17 5s. per ton f.o.b. Hull, £17 5s. to £17 7s. 6d. f.o.b. Liverpool, and £17 7s. 6d. to £17 10s. f.o.b. Leith, for early delivery. No first-hand transactions have been reported in the forward position, and evidently buyers and sellers have both adopted a waiting policy.

Nitrate of Soda.

Owing to the arrival of fresh supplies in this country, the market has become easier, and the spot quotations are now 16s. 6d. per cwt. for ordinary, and 17s. 3d. for refined quality.

Sulphate of Ammonia.

From another source, it is stated that prices have been considerably lower during the past week Outside London, makes are quoted at £16 12s. 6d; Hull, £17 15s.; Liverpool, £17 7s. 6d.; Leith, £17 7s. 6d. to £17 10s.; Middlesbrough, £17 7s. 6d.

COAL TRADE REPORT.

Northern Coal Trade.

The large amount of coal needed by the Government has stiffened the market, and made fuel rather scarce for the moment; so that some large collieries have little coal free for early sale. Prices, therefore, are rather irregular. Best Northumbrian steams are nominally 30s. per ton f.o.b.; and second-class steams are about 26s. to 27s. per ton. Steam smalls are also strong, and are quoted from 13s. to 17s. per ton f.o.b., according to class. Production is good; and the demand is heavy, especially for early shipment. This pressure for shipment is accompanied by some ease in freights, especially to the Mediterranean; but to the Thames there is not much difference yet. In the gas coal trade, there is a full demand, and best Durhams may be said to be about 25s. per ton f.o.b.—early supplies being still somewhat scarce. Second-class gas coals are steady at 22s. 6d. to 23s. per ton. For "Wear Specials," the market is active, and the quotation is from 25s. 6d. per ton f.o.b. Deliveries on the long contracts are fairly good at present; and there is now a slight reduction in the consumption. Little is being done in new contracts; but easier freights to Genoa may cause sales and a few cargoes. The collieries, however, sell with caution, and seem to vary quotations with the altering conditions. There are some buyers who still hold back; so that negotiations are not as far advanced as is sometimes the case for gas coal for the season's shipments at this time of the year. Coke is generally steady. Good gas coke is in tolerably full supply, and may be quoted from 27s. to 29s. per ton f.o.b. in the Tyne.

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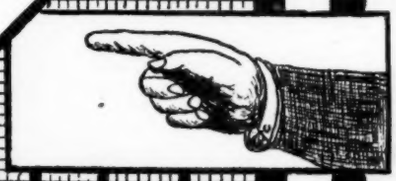

London Office—
165, GRESHAM HOUSE,
OLD BROAD ST., E.C.

Oldham Plumbers and the Corporation Gas Committee.

The dispute which arose between the Oldham and District Amalgamated Building Trade Workers and the Oldham Corporation Gas Committee, regarding rates for fixing gas apparatus, has now been settled. A fortnight or so ago, the General Manager of the Gas and Water Departments (Mr. Arthur Andrew) reported that he was without a decisive answer to the offer made by the Committee on Dec. 15 last. It was then decided by the Committee that, unless the terms were accepted by Jan. 26, they would be withdrawn. A deputation composed of Mr. Percy Skipworth, President, and Mr. John W. Vaughan (the Secretary of the Amalgamated Building Trade Workers) has since waited on the Gas Committee, and signified their acceptance of the conditions laid down by the latter—namely, "That the Gas Committee agree to pay the standard rate of wages of plumbers to all the men employed in the gas department engaged on the fixing of gas-fires, geysers, and the running, fixing, bending, and jointing of all pipes in connection therewith, on the consumer's side of the meter; but this resolution is not to apply to the fixing of gas-cookers and the pipes in connection therewith."

Grantham Water Company.—The half-yearly meeting of the Company was held last Tuesday, Mr. J. G. Thompson presiding. The Directors reported that the balance in favour of the Company was £6062; and out of this they proposed the payment of a dividend at the rate of 5 per cent. per annum, carrying forward the balance to the next account. The report was adopted, and the resolution as to the dividend was duly passed.

Gas Matters at Ripon.—At a meeting of the Ripon City Council last week, Mr. Thorpe complained of the omission from the minutes of the record of business transacted by the Gas Committee on Jan. 24. He moved that, "subject to borrowing powers being obtained, the contract for the erection of new plant at the gas-works be open to competition, such tenders to be submitted to the full Council; and the Gas Committee be not empowered to bind the Council to any firm to carry out the work." The motion was carried. Mr. Brown (the Chairman of the Gas Committee), in reply to questions, said the Committee were convinced that the vertical retort system was the best. Alderman Thirlway remarked that he was not satisfied with the way the thing was going on; and he moved "that another engineer be called in to report on the advisability or necessity of a new class of retorts; and as to whether the works could not be put into full working order until after the war, when prices would be lower." Alderman Metcalfe observed that the passing of this motion would put the Council in a peculiar position in regard to Mr. J. Wilfrid Dunn, whom they had already engaged. The amendment was carried by eight votes to three; but a motion that the proposed payment of 50 guineas to Mr. Dunn, in the event of the scheme not going through, should be referred back, was lost.

Swansea Gaslight Company.

The report of the Company for the year ended Dec. 31 states that, an interim dividend for the half year ended June 30 having been paid, the Directors now recommend the declaration and payment of the statutory dividend at the rate of 5 per cent. per annum (less income-tax) for the half year ended Dec. 31. The past year has been abnormal and unprecedented in regard to the high prices of coal, oil, materials, and cost of production. The popularity of gas, however, proved greater than ever, and, despite economies, particularly in public lighting—the reduced consumption amounting to over 70 per cent.—the total sales of gas compare favourably with the previous year. Acting under instructions from the Ministry of Munitions, the Company have been producing and recovering toluol and benzol. With great reluctance the Directors were compelled to increase the price of gas in July (eleven months after the outbreak of war) to enable them to meet the enormously increased cost of raw materials; and it was regretted that the continued and unfortunate development of these increases, principally in wages, will render necessary a further temporary increase in the price of gas in the near future. The works, plant, and mains have been maintained in an efficient condition. It has been rendered impossible to commence constructional operations on the new works site at Morriston, owing to the obvious adverse circumstances. In order to provide for the present developments in the Company's business, application is being made to the Treasury for sanction to an issue of capital, the greater portion of which will be expended on additional manufacturing plant, thereby increasing the producing capacity of the works by over 20 per cent. The Directors, therefore, shortly anticipate inviting tenders for a small amount of 5 per cent. ordinary stock. The financial strength of the Company has enabled the reserve fund investments to be written-down to their market values on Dec. 31, and leave a substantial reserve fund of £25,651.

Willenhall Gas Company.—At the half-yearly meeting of the Company, the Chairman (Mr. C. Tildesley, J.P.) remarked that there had been a considerable increase in the sales of gas, chiefly for manufacturing purposes. The report and accounts were adopted, and the dividends recommended were declared.

Shortage of Labour at Gas-Works.—At last Wednesday's meeting of the Stockport Town Council, Mr. S. Meunier (the Gas Engineer) submitted a letter from the Board of Trade stating that they had communicated with contractors on the subject of the supplies of coal, and had brought the engineer's representations as to shortage of labour and similar difficulties to the notice of the Labour Exchange and the Chief Industrial Commissioners' Departments. The Engineer also submitted a letter from the Minister of Munitions stating that the question of labour shortage had been brought to the attention of the Home Office Committee concerned with the supplies of coal. Regarding labour difficulties, the position of establishments supplying power, light, and heat for carrying on munition work was being dealt with in the Bill now before Parliament for amending the Munition Act.

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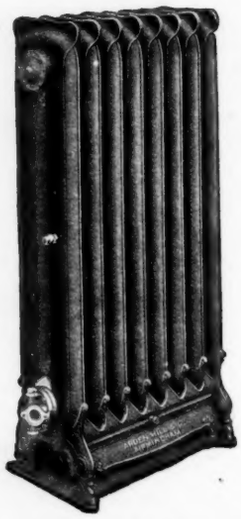

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ON HIRE WITH MANY IMPORTANT GAS UNDERTAKINGS.

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Bolton Town Council and a Gas Committee Minute.

At a meeting of the Bolton Town Council last Wednesday, Mr. Haythornthwaite, on the minutes of the Gas Committee, asked whether or not a certain firm was British. Mr. J. H. Crook (the Chairman of the Gas Committee), in his reply, indicated that the directors of the company referred to were British subjects, as were the shareholders, with the exception of one. There were 1500 British employees, while 100 of the staff were with the Colours. He was informed that the Government had done business with the firm. Mr. Haythornthwaite said he had a document issued from the Companies' Registration Office, London, dated 1914, which gave a summary of the share capital and shares of the company, and showed the names, addresses, and occupations of the shareholders. This indicated that there were nearly 400,000 shares in the company, almost 80,000 of which were then held by two German subjects resident in Germany, about 2000 by a German subject resident in this country, 200,000 by naturalized subjects of German origin, and nearly 100,000 by the wife and daughter of a naturalized German member of the firm. The matter was discussed at length, Mr. Driver pleading for confidence in the Government, a department of which, it had been stated, was doing business with the firm. The Chairman of the Gas Committee assured the Council that further inquiries would be made into the matter. If the concern was found to be enemy owned, immediate steps would be taken to effectively deal with the position.

Grantham Gas Company.—At the half-yearly meeting of the Company last Tuesday, the Directors reported that, notwithstanding the stringent restrictions as to lighting which it had been considered necessary to enforce during the period under review, the consumption of gas still showed a moderate increase, owing to the large quantity that is now taken for heating and cooking purposes. The report was adopted, and a dividend at the rate of 5 per cent. per annum was declared.

Further Increase in Price at Pontefract.—Following on an increase three months ago in the price of gas, from 2s. 11d. to 3s. 2d. per 1000 cubic feet, the Pontefract Town Council last week unanimously agreed to a recommendation of the Gas Committee that the price be raised by a further 6d. from April 1. The Committee presented a provisional trading account showing that on the actual expenditure for the past nine months and the estimated income and expenditure for the remaining three months of the year there would be a deficit on the year's working of some £930. Mr. Holmes pointed out that last year the gas-works made a profit of £535, in 1914 of £1011, and in 1913 of £1306; and he asked why the gas consumers could not be allowed to dip into this. Alderman Pease said that the profit consisted mainly of stock and book-debts; and the Borough Accountant (Mr. H. A. Gill) pointed out that, though there was an accumulated surplus of £2875, it would be bad policy to draw out of reserves at the present time, faced as they were with the certainty of having to pay higher interest on their borrowings during the coming year.

Decreased Consumption at Scarborough.

The Directors of the Scarborough Gas Company, in their report to the shareholders on the working during the year ended Dec. 31, state that, after providing for interest charges and dividends on the preference stock, they recommend the payment of the usual dividends on the ordinary stocks for the year at the rate of 5 per cent. per annum. The sale of gas decreased by 26 per cent. compared with the previous twelve months. This is entirely due to the conditions existing in the town; and, taking into account the lighting restrictions, the absence of visitors during the season, and the large number of uninhabited houses, is less than might have been expected. An increase in the price of gas was delayed as long as possible, but could not be further postponed when the enormous advance in the cost of raw materials became known. The increase of 4d. per 1000 cubic feet was applicable to the second half of the year only, and increased the revenue by about £2000. In addition to this amount contributed by the consumers, if has been necessary to take a sum of £6708 from the reserve account, and to suspend the depreciation on cooking-stoves, &c. During the year the Company received instructions from the Ministry of Munitions to extract certain constituents from the gas, required to increase the supply of high explosives, and at once complied with the request. Already, thirty-two of the Company's employees have joined the forces, and allowances amounting to £771 have been paid to dependants. Increases in wages, to the extent of about £700 per annum, have also been granted to meet the extra cost of living.

Sulphate of Ammonia Exports.—Speaking at a recent meeting of the Surrey County War Agricultural Committee, Sir Sydney Olivier (Secretary of the Board of Agriculture) said the total production of sulphate of ammonia in this country was 420,000 tons a year; and the agriculturists had never used more than one-tenth of the production, and had never in the slightest degree suffered from the exports. The spring was the only time when there was a considerable demand for it; and during the spring months its export was going to be entirely suspended. It was untrue to say that the total exports had increased.

Sunderland and South Shields Water Company.—The Sunderland and South Shields Water Company had a revenue of £119,628 from water-rents last year, as compared with £114,755 in 1914. The Directors recommend that dividends for the half year ended Dec. 31 be declared at the following rates, free of income-tax: On the ordinary and preference stocks, 4½ per cent.; on the additional capital stock (maximum dividend 7 per cent.), £3 3s. per cent.; on the additional ordinary capital stock (maximum dividend 5 per cent.), 2½ per cent., making, with the interim dividend, a dividend for the year on the different stocks, less income-tax, of 9 per cent., £6 6s. per cent., and 4½ per cent. respectively. The works of the Company have been maintained during the year; but considerable expenditure has been deferred, owing to the war. There were 2823 yards of mains laid in 1915, making a total of 391 miles in the Company's area.

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The Casing is lagged with Sheet-Iron and insulated with Slag Wool, thus retaining and utilizing the heat to the fullest extent.

Right or Left-Hand Connection.

The 'Maelstrom' Circulator.

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No Wrought-Iron Tubing is used in the construction of the Boiler.

There are no flue cavities, as the Boiler provides its own Flue.

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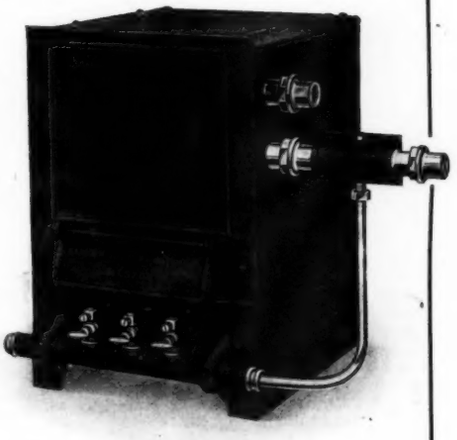

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The Stockport Corporation minutes show that, at the meeting on Jan. 11, £4751 was authorized to be paid as income-tax on gas profits. The income-tax on the electricity undertaking profits was £1448.

The York Water Company have decided to make substantial reductions in charges in view of the stress of the times. At the half-yearly meeting last Thursday—Alderman Sir Joseph Sykes Rymer (the Chairman) presiding—dividends were declared of 5 per cent. on the 1876 preference shares, 3½ per cent. on the 1896 and 1900 preference shares, and 7 per cent. on the new ordinary shares.

Under the auspices of the Leeds Philosophical Society, another course of lectures on municipal undertakings has been opened; the first, on Friday last, being by Mr. C. G. Henzell, the Leeds Water Engineer, who dealt with the Ure Valley water supply scheme, and illustrated his lecture by lantern views. Mr. Henzell traced the history of the scheme, mentioning the claims of Bradford and Harrogate on the ground, and proceeded to describe the extensions being carried out by Leeds, in regard to which the city obtains a gathering-ground of 18,141 acres, representing a daily yield of over 23¼ million gallons, of which 15½ millions will be available for Leeds and 7¾ millions for compensation purposes. The work on this scheme, it was stated, is now well in hand.

The Directors of the South Staffordshire Water Company have resolved (subject to audit) to transfer £2000 to the credit of the depreciation fund, and to recommend to the proprietors the declaration of a final dividend for the year ended Dec. 31 on the ordinary stock at the rate of 6½ per cent. per annum, less income-tax (making with the interim dividend 6½ per cent., less income-tax, for the year), carrying forward a balance of £9209.

Six persons were affected by a gas escape in Bradford last week. Two children died, one of whom, however, was ill; and it is not definitely established that death was directly due to the gas. It appears that for some time there had been the smell of escaping gas in Crown Street, Sunbridge Road; but it had not been sufficient to call for report to the authorities. The family principally affected is composed of the wife and four children of Sergeant Rowan, who is at the front. As nothing was seen of the family on Friday morning, neighbours tried to gain admittance; and eventually the door was opened by Mrs. Rowan, who in a dazed manner pointed upstairs, and then collapsed. The children were rescued by the neighbours. The youngest, a baby, was dead, and the others were suffering from the gas. It was also found that a six-year-old boy next door, who was ill, had died. There had been a smell of gas and a slight explosion in that house during the night.

STOCK MARKET REPORT.

THE general course of things on the Stock Exchange last week was to a great extent a repetition of its predecessor. Business was decidedly on a quiet scale, and there were intermittent periods of dulness alternating with recovery of firmness in several lines. The intelligence received from the various fields of hostilities did not amount to a moving factor; but political relations—especially those affecting the United States and Germany—were prominent. In Government securities, the War Loan and Consols were steady, although not active. It is believed that a considerable amount was placed in Exchequer Bonds and Bills which otherwise would have come into Capel Court for investment—the State being to this extent in competition with the House. The demand for Colonial issues was strong. Home Rails, in spite of dividend announcements of a satisfactory character, dragged considerably. The American Market was in poor case; the aspect in the German question being highly disquieting. Canadians suffered in consequence, notwithstanding the grand business they are and will be doing. In Foreign, the French loan went well, despite momentary checks. Japanese was uniformly strong and in good request. The £5,000,000 loan to Russia which Japan is said to be negotiating indicates her financial strength. In the Miscellaneous group, the most conspicuous was rubber, which, after a rather poor start (the sequel of the previous week's check), had a good time and finished up strong. Copper, oil, and textiles were also well supported. Among topics of interest, the report of the Montagu Committee was welcomed as a step in the right direction; but some of its features came in for criticism—the 15s. 6d. deposit scheme being widely regarded as ill-calculated to win the sympathy of the working man. On the other hand, the concession of exemption from income-tax to the small investor in Exchequer Bonds through the Post Office was well favoured. It is to be hoped that these piecemeal boons may not be arriving too late to catch the interest of the million. Business in the Gas Market was scarcely up to the measure of the preceding week in point of volume; but some issues which do not often appear were dealt in; and the general tone was quite firm. The impression created by the meeting of the Gas Light and Coke Company on Friday was favourable. In the Money Market, supplies were ample and rates were easy.

Bargains done for cash during the week were as follows: On Monday, Imperial Continental 69¾, 70, 70¼, Primitiva 45s, South Metropolitan 77, 78. On Tuesday, Imperial Continental 70¼, Primitiva 45s., South Metropolitan 77¼, 78, Tuscan debenture 80, 80½. On Wednesday, Gas Light ordinary 76, 76¼, 76⅜, 76½, 76¾, 77, ditto maximum 60, 60⅛, Newcastle 90⅛, Oriental 99, 99½, Primitiva 40s. 6d., ditto preference 3⅝, South Metropolitan 77, 78. On Thursday, Bombay 4 11/16, 5, Bournemouth "B" £11 16s., £11 17s. 6d., Commercial 4 per cent. 75⅛, 75⅝, 75¾, Gas Light ordinary 76½, 77, Primitiva preference 3 11/16, South Metropolitan 77, 78. On Friday, Commercial 4 per cent. 75⅝, Gas Light ordinary 76½, 77, ditto maximum 60, 60⅛, Melbourne 92⅝, 94½, Primitiva preference 3 11/16, South Metropolitan 78½. On Saturday, Alliance and Dublin debenture 65 11/16, Commercial 4 per cent. 75¼, 75½, ditto debenture 56, Imperial Continental debenture 77⅞, 66, South Metropolitan 77⅞, 78.

The Bank rate is 5 per cent.—as fixed on Aug. 8, 1914.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue.	Share.	When ex-Dividend.	Previous Div or Dividend & Bonus.	Last Dividend.	NAME.	Closing Prices. July 30, 1914.	Yield on Highest Closing Price.	Lowest and Highest Prices of Bargains.
£			p.c.				£ s. d.	
1,551,868	Stk.	April 8	2½	5⅛	Alliance & Dublin Ord.	59—64	8 18 2	..
874,000	,,	July 10	4	4	Do. 4 p.c. Deb.	76—79	5 1 3	65 11/16
280,000	5	April 29	7½	3/-	Bombay, Ltd.	5⅞—6⅜	5 17 8	4 13/16—5 1/16
50,000	10	Feb. 26	16	15/-	Bournemouth Gas and Water { 10 p.c.	29—30	5 6 8	..
878,480	10	,,	7	7/-	B 7 p.c.	15—15½	4 10 4	11/16/0-11/17/6
95,000	10	,,	6	6/-	Pref. 6 p.c.	13½—14	4 5 9	..
147,210	—	—	—	—	Deb.	..	—	..
880,000	Stk.	Feb. 26	†14	£6/-	Brentford Consolidated	261—266	5 5 8	..
880,000	,,	,,	†11	55/-	Do. New	204—209	5 5 8	..
50,000	,,	,,	5	5	Do. 5 p.c. Pref.	109—111	4 10 1	..
206,250	,,	June 11	4	4	Do. 4 p.c. Deb.	91—93	4 6 0	..
217,380	Stk.	Feb. 26	11	10⅜	Brighton & Hove Orig.	208—213	5 3 4	..
244,200	,,	,,	8	7⅜	Do. A Ord. Stk.	154—159	5 0 8	..
530,000	20	Mar. 26	12½	22/6	British	44—45	5 11 1	..
120,000	Stk.	June 26	4	4	Do. 4 p.c. Deb. Stk.	88—90	4 8 11	..
245,771	Stk.	June 26	4	4	Buenos Ayres 4 p.c. Deb.	85—87	4 12 0	..
100,000	10	—	—	—	Cape Town & Dis., Ltd.	1½—2½	—	..
100,000	10	—	—	4/6	Do. 4½ p.c. Pref.	4—6	—	..
100,000	Stk.	June 26	4½	4½	Do. 4½ p.c. Deb. Stk.	70—75	6 0 0	..
157,150	Stk.	Feb. 26	5	5	Chester 5 p.c. Ord.	108—110	4 10 11	..
1,513,280	Stk.	Feb. 12	5/9/4	49/4	Commercial 4 p.c. Stk.	106—108	5 1 2	75¼—75½
560,000	,,	,,	5½	46/8	Do. 3½ p.c. do.	103—105	5 1 6	..
475,000	,,	June 11	3	3	Do. 3 p.c. Deb. Stk.	69½—71½	4 3 11	56
800 000	Stk.	,,	4	4	Continental Union, Ltd.	76—79	5 1 3	..
200 000	,,	,,	7	7	Do. 7 p.c. Pref.	115—118	5 18 8	..
278,400	—	—	—	11½	Croydon B and C 7 p.c.	..	—	..
492,270	Stk.	—	6	6	Derby Con. Stk.	123—125	4 16 0	..
55,000	,,	—	4	4	Do. Deb. Stk.	102—104	3 16 11	..
1,002,180	10	July 29	10	10/-	European, Ltd.	17½—18	5 11 1	..
16,362,910	Stk.	Feb. 12	4/17/4	42/-	Gas Light and Coke { 4 p.c. Ord.	98—102	4 15 6	76—77
2,600,000	,,	,,	8½	3½	3½ p.c. max.	76—79	4 8 7	60—60½
4,062,335	,,	,,	4	4	4 p.c. Con. Pref.	96—99	4 0 10	..
4,674,850	,,	June 11	8	3	3 p.c. Con. Deb.	72½—74½	4 0 6	..
180,000	,,	,,	10	10	10 p.c. Bonds	..	—	..
258,740	Stk.	Mar. 12	5	4½	Hastings & St. L. 3½ p.c.	87—89	5 12 4	..
70,000	10	April 29	11	6	Hongkong & China, Ltd.	16½—16⅞	6 11 4	..
86,600	—	—	—	9½	Hornsey 7 p.c.	..	—	..
131,000	Stk.	Mar. 12	7⅞	7⅞	Ilford A and C	151—154	5 2 4	..
65,780	,,	,,	6⅝	6⅛	Do. B	115—118	5 8 0	..
65,500	,,	June 26	4	4	Do. 4 p.c. Deb.	92—94	4 5 1	..
4,940,000	Stk.	May 14	9	4½	Imperial Continental	150—160	5 12 6	69⅞—70⅛
1,235,000	Stk.	Feb. 12	3½	3½	Do. 3½ p.c. Deb. Red.	84—86	4 1 5	66⅛—67
200,242	Stk.	Mar. 12	6½	6½	Lea Bridge Ord. 5 p.c.	119—121	5 7 5	..
561,000	Stk.	Feb. 26	10	10	Liverpool 5 p.c. Ord. { A	211—213	4 18 11	..
718,100	,,	,,	7		B	146—148	4 14 7	..
306,083	,,	June 26	4	4	Do. 4 p.c. Pr. Deb. Stk.	..	—	..
75,000	5	June 11	6	2/-	Malta & Mediterranean	4⅛—4⅜	6 9 9	..
250,000	100	April 1	4½	4½	Met. of Melbourne { 4½ p.c. Deb.	99—101	4 9 1	92⅞—94⅛
541,920	20	May 28	4	6/-	Monte Video, Ltd.	11⅛—12	6 13 4	..
1,775,892	Stk.	July 29	4½	4½	Newc'tle&G'tesh'd Con.	98⅛—99½	4 10 6	90½
529,705	Stk.	June 26	3½	3½	Do. 3½ p.c. Deb.	82—83	4 4 10	..
55,940	10	Feb. 26	7/14/0	7/8/8	North Middlesex 7 p.c.	14—15	5 2 8	..
900,000	Stk.	May 14	8	8	Oriental, Ltd.	117—122	6 11 2	99—99½
60,000	5	Mar. 26	10	1/-	Ottoman, Ltd.	7⅛—7⅜	6 9 0	..
60,000	50	Feb. 26	13	65/-	Portsea, Island B	128—131	4 19 8	..
100,000	50	,,	12	60/-	Do. C	118—121	4 19 2	..
52,000	50	,,	10	—	Do. D	..	—	..
249,980	5	April 29	8	—	Primitiva Ord.	5⅛—6	6 18 4	40/6—45/-
499,960	5	June 26	5	2/6	,, 5 p.c. Pref.	4⅞—5	5 0 0	3⅜—3 1/16
521,600	100	June 2	4	4	,, 4 p.c. Deb.	91—93	4 6 0	..
—	—	—	—	4	,, ,, ,, 1911	..	—	..
346,198	Stk.	June 26	4	4	River Plate 4 p.c. Deb.	85—87	4 12 0	..
150,000	10	May 14	6	6/-	San Paulo { 6 p.c. Pref.	10⅜—11	5 9 1	..
125,000	50	July 1	5	5	5 p.c. Deb.	47—49	5 2 0	..
135,000	Stk.	Mar. 12	10	10	Sheffield A	233—234	4 9 8	..
209,984	,,	,,	10	10	Do. B	232—234	4 9 8	..
528,500	,,	,,	10	10	Do. C	230—232	4 10 1	..
90,000	10	May 28	9	6/-	South African	10½—11½	7 16 6	..
6,429,895	Stk.	Feb. 12	5/4/0	44/-	South Met., 4 p.c. Ord.	111—113	4 16 8	77—78½
1,895,445	,,	July 10	3	3	Do. 3 p.c. Deb.	72½—74½	4 0 6	..
209,820	Stk.	Feb. 26	8½	8½	South Shields Con. Stk.	157—159	5 6 11	..
952,795	Stk.	Feb. 26	6	48/4	S'th Suburb'n Ord. 5 p.c.	114—116	5 3 5	..
60,000	,,	,,	5	5	Do. 5 p.c. Pref.	110—112	4 9 3	..
135,000	—	—	—	48/4	Do. West Kent.	..	—	..
137,058	,,	June 26	5	5	Do. 5 p.c. Deb. Stk.	116—118	4 4 9	..
629,740	Stk.	May 14	5	5	Southampton Ord.	99—102	4 18 0	..
120,000	Stk.	Feb. 12	7½	7½	Tottenham District { A 5 p.c.	135—138	5 8 8	..
742,275	,,	,,	6	6	B 3½ p.c.	115—117	5 2 7	..
181,255	,,	June 26	4	4	4 p.c. Deb.	87—89	4 9 11	..
182,380	10	Dec. 30	5	—	Tuscan, Ltd.	5—6	8 6 8	..
149,900	10	July 1	5	5	Do. 5 p.c. Deb. Red.	93—95	5 5 8	80—80½
236,476	Stk.	Mar. 12	5	5	Tynemouth, 5 p.c. max.	108½—109½	4 11 4	..
					Wandsworth, Wimbledon, and Epsom—			
30,000	Stk.	Feb. 26	8⅜	78/9	Wandsworth A 5 p.c.	151—156	5 7 4	..
255,636	,,	,,	6½	63/9	,, B 3½ p.c.	129—134	5 2 7	..
108,075	,,	,,	5/17/8	55/1½	,, C 3½ p.c.	110—115	5 2 0	..
352,000	,,	,,	6½	57/6	Wimbledon 5 p.c.	117—122	5 0 5	..
98,000	,,	,,	6⅜	63/9	Epsom 5 p.c.	121—126	5 5 2	..
88,416	,,	June 26	3	3	3 p.c. Deb. Stk.	66—69	4 6 11	..

† Paid on Old 10 p.c. and 7 p.c. Standard Stocks.